IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF PENNSYLVANIA

STEVEN R. ARCH, et al., Plaintiffs, vs. THE AMERICAN TOBACCO COMPANY, et al., Defendants.	)	CIVIL ACTION No. 96-5903-CN (Volume II) (Pgs. 313 - 584)

Deposition of: WILLIAM A. FARONE, Ph.D. (Volume II)

Date and time: Wednesday, August 27, 1997, 10:10 a.m.

Location: 5 Park Plaza, Suite 1100
Irvine, California

Reporter:
Patricia Tornell, CSR
Certificate No. 2974

Volume II of the deposition of WILLIAM A. FARONE, Ph.D., taken before Patricia Tornell, Certified Shorthand Reporter, Certificate No. 2974, commencing at 10:10 a.m., Wednesday, August 27, 1997, at the Law Offices of Jones, Day, Reavis & Pogue, 5 Park Plaza, Suite 1100, Irvine, California.

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I N D E X

Witness: WILLIAM A. FARONE, Ph.D. (Volume II)

E X H I B I T S

Defendant's   Description   Page

17   Document entitled "Liability

E-X-H-I-B-I-T-S (Continued):

INFORMATION REQUESTED IDENTIFIED FOR COUNSEL:

Page	Line	Page	Line
(None)		(None)	

IRVINE, CALIFORNIA
WEDNESDAY, AUGUST 27, 1997
10:10 A.M.

WILLIAM A. FARONE, Ph.D.,
called as a witness, and having been first duly sworn by the Certified Shorthand Reporter, was examined and testified as follows:

EXAMINATION (Continued)

BY MR. BHATIA:

Q Good morning, Dr. Farone.
You understand you're still under oath?

A Yes, I do.

MR. BHATIA: We are starting today at 10:10. We were prepared to start at 9:00 a.m., but there was a problem with the court reporter's machine and, unfortunately, a replacement machine had to be sent. So while the witness was here at nine o'clock, we were not able to start the deposition at nine o'clock.

BY MR. BHATIA:

Q Dr. Farone, have you seen a copy of the first day of your deposition?

A No, I haven't.

Q Okay. Do you remember your testimony?

A Yes, I do.

Q And you believe your prior testimony was correct?

A As far as I recall, yes.

Q Is there anything you want to change in your prior testimony?

A Not change. I mean there's more documents I reviewed that I think I sent you since the last time which augments the testimony I gave. Doesn't change anything, just adds to it.
For example, we discussed making a safe cigarette, and we read something about you couldn't make a cigarette that was absolutely safe.
One thing that I've looked at since that time

16 is making a cigarette that's safe within a definition of
17 "safe" that scientists could agree upon, for example, so
18 that gives you a target of what "safe" means. And that
19 changes -- you know, you could then make something to that
20 target. It still wouldn't be absolutely safe, but it
21 would be safe within the definition that you set up.
22 Q Is this the same thing as your definition of
23 a safer cigarette?
24 A No. "Safer" simply means that I lower the
25 level of toxicity from where it is now. "Safe" means

1 something that scientists, FDA, whoever you want to look
2 at this, would consider to be safe. And the trick is to
3 get them to agree on the definition.
4 And, for example, if I made a cigarette that
5 was no more injurious than breathing Rocky Mountain air,
6 for example, if I could do that, would we agree that
7 that's safe?
8 Once you set the definite target, then you
9 can talk about making that cigarette.
10 The last time we discussed making it safer,
11 and I gave you a list of all of the things you could do to
12 make it safer. So what I've done since the last
13 deposition is think about, given a definition of "safe,"
14 how you could make it safe.
15 Q What is your definition of an absolutely safe
16 cigarette?
17 A Well, again, "absolutely" doesn't work in
18 science. But in terms of a definition of "safe," if we
19 accepted the Rocky Mountain air analogy, for example, if
20 people said, "Okay, if you put in a nicotine analogue that
21 did not have any cardiovascular effects, just had the
22 central nervous system -- the beneficial effects of
23 relaxing or stimulating or that combination of things, and
24 if we only added to that flavor compounds or aromatic
25 compounds that we agreed were not carcinogenic,

1 teratogenic or didn't have any biological activity --

examples would be some esters that are fragrances from fruits and vegetables, things of that sort -- and if that combination was inhaled, then I think we could get the general consensus among the scientific community that that would be safe.

Q Okay. You said that you had reviewed some documents that led you to this general consensus definition of a safe cigarette.

A Yes.

Q What did you review?

A Well, I sent you -- there was an article that -- the main thing is the Banzhaf -- is Dr. DeNoble's disclosure, if you will, that has appeared in two places, the disclosure that nicotine analogues were in fact made which did not have cardiovascular effects, and --

MR. SHUB: He's in the middle of his answer.

Go ahead, Doctor.

MR. BHATIA: I didn't interrupt.

MR. SHUB: You were about to.

Go ahead, Doctor.

MR. BHATIA: Did I interrupt him?

MR. SHUB: Go ahead, Doctor.

MR. BHATIA: Wait. No. No. I mean we're not going to have this again, Jonathan, like we had at the

last deposition. I did not interrupt the witness. I did not even open my mouth. You interrupted the witness.

MR. SHUB: Dr. Farone, please finish your answer.

THE WITNESS: And that these were tested and found to not affect the -- found not to have the cardiovascular effects but to have the other effects of nicotine.

BY MR. BHATIA:

Q Okay. Starting with Dr. DeNoble's disclosure, how did you become aware of that?

A The disclosure was faxed to me.

Q From whom?

A I don't recall.

Q Did you provide that to me?

A Yes. It was in the top of the stack.

Q Can you show it to me, please.

I'm showing you the documents you provided to me.

A Should be in the -- right here.

Q This document, which we're going to mark as

the next exhibit, FAR3488 --
What's the next number?
THE REPORTER: 17.
BY MR. BHATIA:
Q -- Exhibit 17, Dr. Farone, it appears to be a three-page fax that was sent to you. Where's the first

two pages of the fax?
A I don't -- the first page of the fax is the transmission sheet.
(The document referred to above was marked Defendant's Exhibit No. 17 for identification by the Certified Shorthand Reporter and is attached hereto.)
Q Where is that?
A I don't keep those.
Q You throw them away?
A Yes.
Q Is that your routine practice, to throw a away documents?
A To throw away cover pages of faxes that I either send or receive. That's our routine practice.
Q Do those covers pages ever contain notes?
A They can. They can contain notes. I mean they can say, "Here's something for your interest" or something of that sort.
Q Nonetheless, you just throw them away?
MR. SHUB: I'm going to object. It's been asked and answered, and I don't think you should harass him.
THE WITNESS: Yes, I throw them away.
BY MR. BHATIA:
Q Okay. Where is page 2 of the fax?

A The part that I reviewed for this testimony that I think under your thing that you asked me to do that I'm compelled to provide to you is the part that I rely on for the testimony.
Q No. It's the stuff you reviewed, sir.
A I didn't review it. I don't -- I stated before --
Q You didn't read page 2 of the fax?
A I tear off the fax transmittal information, and -- I mean that's all -- I think the second page said, "Here's something for you that..." -- I think it was from Sheller. Is it from Steve Sheller?

Q It appears to be.
A Okay. So that's what it would have said.
Q Dr. Farone, this is the only thing you've looked at in terms of recent disclosure from Dr. DeNoble?
A No. I read the publicly available article off the Internet in the -- I think it was the Dallas newspaper had a similar article, but that's the one that I'm relying on because I had the text of that one. I don't have the text of the Dallas Morning News because I don't subscribe to that newspaper.
Q Okay. Well, where is it in this article that one can find your definition of a safe cigarette, sir?
A No. The article describes a replacement for

nicotine which does not have the cardiovascular effect.
Q Okay.
A That allows me to make a definition of a safe cigarette which I couldn't do the last time because even after you take away the carcinogens and the teratogens and everything else, you're left with the cardiovascular effects.
Q Does the article disclose the data on which Dr. DeNoble relies?
A No.
Q You're a scientist, aren't you, sir?
A Yes.
Q You look at data, don't you?
A I come to conclusions. Data is frequently used to help come to those conclusions.
Q As a scientist, do you typically rely on articles on the Internet to come to conclusions?
A Yes.
Q And the mere fact that Dr. DeNoble says that he has found this analogue is sufficient for you to come to the conclusion that now a safe cigarette could be made?
A Not only that, no.
Q What else do you rely on?
A I rely on the fact that I worked at Philip Morris and, in fact, I know that the analogues were made

and that the people who worked for me made the

analogues
and that they were tested, but that I did not -- I don't
know that I had -- well, I didn't have access to the
results of those tests, so what Dr. DeNoble -- the niche
that he is filling, which I wasn't aware of before I read
the article, is that the results of those tests did in
fact come up with a material that fulfilled the criteria
for which they were designed.
Q But the only thing you have to rely on is
Dr. DeNoble's report of what the tests show; correct?
A With regard to the ability to do
this, it's -- in a sense you had asked me before if I
could think of a way to make an absolutely safe
cigarette. Okay? That was the question. You showed me a
document in the last deposition, and you asked me would I
agree with the first statement in the document which said
that as far as we know you can't make an absolute safe
cigarette, and I said, yes, I agreed with that statement.
You're asking me today if I had any further
thoughts on that, and I'm saying, well, if you define what
"absolute safe" means, then I can -- what "safe" means,
then I can do it.
Q Again, I think coming back to the question I
posed to you, is the only thing you're relying on in terms
of the ability to develop a successful analogue

Dr. DeNoble's report in Exhibit 17?
A No.
Q What else are you relying on?
A My scientific ability, knowledge, and ability
to connect different things together to come up with a
hypothesis that says, "Okay. Now, this is how you would
go about doing it."
Q Dr. Farone, when you were at Philip Morris,
you were aware that Philip Morris was doing nicotine
analogue research; correct?
A Correct.
Q And, in fact, Philip Morris published some of
its work on nicotine analogues, didn't they?
A They did not publish results concerning

the
15 human effects of whether they had succeeded in
making
16 something which was not cardiovascular. I don't
believe
17 they did.
18 Q But did Philip Morris publish it's
research
19 or some of its research on the nicotine analogue
program?
20 A No. They patented it for use, for
example,
21 as an insecticide and things of that sort, yes.
22 Q Didn't Dr. Seeman also share some of
the
23 analogues that were being prepared at Philip Morris
with
24 government officials?
25 A Yes, he did.

1 Q So the work at Philip Morris on
developing
2 nicotine analogues was not a secret, was it?
3 A The work was not a secret. The test
results
4 of whether or not the analogues succeeded in solving
the
5 problem of cardiovascular effects was a secret.
6 Q Indeed it was such a secret that while
you
7 were at Philip Morris you never even saw the results
of
8 those tests; correct?
9 A That's correct.
10 Q So the only basis that you have to
testify
11 here today that those test results were in fact
successful
12 is the statement by Dr. DeNoble in Exhibit 17;
correct?
13 A It's not the only basis, in my opinion.
14 Q Well, respectfully, sir, you didn't see
test
15 results while you were a Philip Morris; right?
16 A Correct.
17 Q And have you seen any test results
since
18 leaving Philip Morris on the nicotine analogue
program?
19 A Yes, I have.
20 Q What have you seen?
21 A I've seen documents which I believe are
22 privileged in the states that they were presented to
me
23 in, and, therefore, I have not relied on them for
this
24 action.
25 Q So you've seen some documents, but
you're not

1 willing to identify them for me; is that correct?
2 A If you would like, I can go back and
try and

find them. You know --
Q Well, respectfully, --
A But that's --
Q -- Dr. Farone, you said that you'd give me the documents that you relied on. You now tell me that you're relying on some documents that you consider to be privileged?
A No.
Q Is that your testimony?
A No. I'm relying on my scientific ability. Now, if you are saying that I can't make a hypothesis about a safe cigarette when I know that if you made such an analogue that it would be safe -- it came up because of this article, and I'm not going to concede the point that I'm relying exclusively on that article, that particular document, when I believe I'm entitled to use my scientific ability to reach an expert opinion.
Q Well, what about your scientific ability causes you to come to the conclusion that Philip Morris made a successful nicotine analogue?
A That's not -- I didn't say they did. I said hypothetically as a hypothesis if in fact you could make a safe -- that is, no cardiovascular effect nicotine

analogue -- then it follows that you could make a safe cigarette.
Q Okay. Before we get to that, can you stick with my question, please, which is what evidence do you have that Philip Morris actually did make a nicotine analogue that had none of the cardiovascular effects of nicotine?
A The only article that I have that makes that particular statement is Dr. DeNoble's article.
Q Which is Exhibit 17, sir?
A Yes.
Q And that is the newspaper article that was faxed to you from some unknown source?
A I think it was Steve Sheller. I just saw the top part.
Q Steve Sheller's another plaintiffs' lawyer in many of the suits against the tobacco industry;

correct?
A Yes, I believe so.
Q And so it's just another one of these random documents that the plaintiffs' lawyers have sent you to form the basis of your opinion; right?
A Not random, obviously, but, yes.
Q Carefully selected maybe. Would that be more correct?
A To the point --

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MR. SHUB: Object.
THE WITNESS: -- would be most correct.
BY MR. BHATIA:
Q Okay. What is the basis for Dr. DeNoble's statement in Exhibit 17?
A If I recall from some of the other articles, it was test results that either he performed or he saw.
Q What was the nature of the test results that he performed or that he may have seen?
A Well, he did the rat studies that we know of that were -- I think I provided you at least one report in the last set of documents of Dr. DeNoble's research work.
Q What evidence do you have that the analogue that Dr. DeNoble is referring to in Exhibit 17 was tested in rat studies?
A I haven't compared -- I haven't talked to him about what's in there, which one he's referring to, exactly which ones, and I haven't compared that with the rat work that he did, so I can't answer that.
Q If you learned that the analogue that Dr. DeNoble is referring to in Exhibit 17 was tested one time and one time only and in one rat and one rat only, would that in any way change the basis for your opinion that a safe analogue had been developed by Philip Morris?

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A My opinion is that a safe analogue can be developed. That's why we had the program going on. And it would change my opinion of whether one was developed. It may not change my opinion about whether you can develop a safe analogue. And if you can develop a safe analogue,

then you can make a safe cigarette.
Q Who was in charge of the analogue program at Philip Morris?
A I don't think --
MR. SHUB: What year? What time frame are you talking about?
MR. BHATIA: Go ahead, sir.
THE WITNESS: I don't think I can really tell you who was in charge of the analogue program at Philip Morris.
BY MR. BHATIA:
Q In the time you were at Philip Morris were you in charge of the nicotine analogue program?
A The people working on the program reported to me during a period of time that I was at Philip Morris.
Q Which period of time was that?
A '82, '83, the Organic Chemistry Division reported to me, I believe, during that period.
Q Who were the people at Philip Morris with principal responsibility for synthesizing nicotine

analogues?
A Dr. Seeman, Dr. Secor, Chuck Chavdarian, Bill Edwards. I don't know which roles -- it's been a long time since I've looked at exactly who did what, but I think maybe Yoram Youminer made some, but there were chemists in the Chemical Research Division who did the synthetic work on the program. From time to time who was doing it changed, but Jeff Seeman was involved in that for -- probably from the beginning of when I knew about it until the time I left.
Q At some point in time Jeff Seeman reported to you; is that right?
A That's correct.
Q Is he a good chemist?
A Yes.
Q What do you think of his work?
A From what I know of it, his work was okay.
Q Do you think him to be a scientist of good intellectual integrity?
A I published papers with Jeff. You know, we worked together, and whatever disagreements or -- when you work with somebody in a supervisor/subordinate

relationship, you know, you talk about the pluses and minuses that people have. But in terms of his scientific ability, obviously, we worked together, and I didn't see

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anything wrong with his ability.

Q When you published papers with him, did you have any basis for challenging the integrity of his findings?

A We always do that in science. We always challenge the integrity of each other's findings.

Q I understand. But when you published papers with him, did you say to him at any point, you know, "We can't write this because it's wrong, and I disagree with your conclusions. Let's change it"?

A Yes.

Q Okay. And did he agree with you?

A Sometimes.

Q And sometimes --

A Sometimes not.

Q And that was just the basis of scientific disagreement?

A Correct.

Q Do you have any basis to say he's a dishonest scientist?

A No, I don't have any evidence.

Q If Dr. Seeman were to testify that he was unable to successfully synthesize a nicotine analogue that did not have the cardiovascular properties -- that did not have any of the cardiovascular properties of

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nicotine, would you have a basis to disagree with his testimony?

A Yes.

Q Okay. And what is that?

A Well, we have two bases. Number one is if you look at the pyridine alkaloids as an entire class, the simplest nicotine analogue is pyridine. And there is a lot of evidence in the literature that that does not have the cardiovascular effects but it does have the CNS, central nervous system, effects. So I think I would call that to Jeff's attention and say, "Well, Jeff, does this qualify as a nicotine analogue that will not have the

cardiovascular effects?"
Q In the work Jeff Seeman was doing on nicotine analogues, wasn't he looking at much more complex analogues than just the pyridine molecule?
A In addition to that, yes.
Q If Dr. Seeman were to testify that they looked at the simple pyridine molecule but found it not to have the CNS properties of nicotine, would that in any way change your opinion?
A Well, that would -- it would provide evidence. I would then confront him with the other literature work that I gave you copies of some of those books which in fact say the opposite, but --

Q Well, can you tell me which document or book you rely on that says pyridine has the same effect on the central nervous system as nicotine when used in the same concentration as nicotine?
A I don't think that's relevant to my argument, so I don't -- I don't understand the question.
Q I understand you may not think it's relevant, but could you answer my question, please.
A I don't know that I can because I don't understand the question.
Q Okay. Can you tell me what you rely on for the proposition that pyridine has all of the central nervous system properties of nicotine?
A I am relying on the books that I gave you which indicate that it has central nervous system effects, that it acts as a depressant, and I showed you some, I think, that went back a hundred years which come to that same conclusion. And so in order to distinguish between exactly what we mean by central nervous system effects gets us into a much more complex discussion. So as soon as you state -- as soon as you use the word "all," you confuse me because, as I tried to indicate before, there's no such thing as "all" in science.
Q What books?
A The Merck Index -- the same ones I presented

before. The Merck Index, the various pharmacopoeia, pharmacology books. I gave you one on the safety of chemicals, I believe, and also I think in that stack

of
stuff was a material safety data sheet for pyridine which
says it's a central nervous system -- I mean it's very
widely known among chemists that pyridine has these
effects. It's a very toxic material.
Q What evidence do you have that pyridine when
smoked will produce the same central nervous system
response as nicotine in a smoker?
A When smoked -- well, the only place where --
of the books that I quoted was that 1896 reference which
makes that sort of statement.
Q Did you bring that book with you today?
A No, I did not.
Q Could you bring it with you tomorrow, please?
A Certainly.
Q In fact, could you bring all the books that
you brought with you on the first day of your deposition
to the deposition tomorrow?
A Certainly can.
MR. BHATIA: Thank you.
MR. SHUB: I just want to let the record reflect
that you, Vineet, had the opportunity to examine those
books. They were provided to you, and you declined the

opportunity to make any copies of those books or to use
the information in the books.
MR. BHATIA: That's an untrue statement.
MR. SHUB: Well, let the record reflect that that's
exactly what happened.
MR. BHATIA: Let the record reflect you made
another untrue statement.
MR. SHUB: What's untrue about it?
MR. BHATIA: We were given the books at the
deposition along with the four boxes of material. It was
not provided to us in advance of the deposition. We were
told that we had to proceed with the witness at our own
peril. We did not have an opportunity to review the books
during the deposition. They were left with us to copy
afterwards. However, we only copied the first pages of
the books. We asked you to bring the books to the
deposition today. That was requested at the end of the
last deposition. You committed that you would do so.

But, unfortunately, the books are not here.
MR. SHUB: Well, you had the books ahead of this deposition. They were provided to you at the last deposition, and you decided you didn't want to copy them.
MR. BHATIA: I'm only asking him to the bring them to the next deposition. Is it that much of a problem? The witness has agreed to do it.

MR. SHUB: It's not a problem. I just want to make sure the record doesn't reflect that they weren't provided to him before today.
MR. BHATIA: No one ever said they weren't.
Can we find out where we were because after that long colloquy by plaintiffs' counsel, I've sort of lost my train of thought.
(Whereupon the record was read by the reporter.)
BY MR. BHATIA:
Q Since our last deposition have you discussed the concept of a safe or safer cigarette with plaintiffs' counsel?
A Yes, I have.
Q What did you talk to them about?
A What did I talk to them about?
Q Yes.
A Exactly what we are talking about here.
Q Well, what did you say to them?
A Well, I said that if you -- if one accepts the premise, the operational hypothesis, that a nicotine analogue can be created which does not have the central nervous system effects and then you added that to a smoking article, a cigarette, which released that compound in addition to flavor chemicals, in addition to things

which would be considered safe by a group of people who would agree on what those criteria would be, that then one could produce a safe cigarette, pointing out that things like Premier and Eclipse are headed in that direction along with work that was done at Philip Morris and other places.
I mean that's where we're going with that whole train of technology, so I don't consider that

to be
anything different.
MR. SHUB: Excuse me one minute. Can you just read
back the first part of the answer because I believe the
witness may have misspoken.
(Whereupon the record was read by the reporter.)
THE WITNESS: Cardiovascular effects. Pardon me.
MR. SHUB: The witness would like to correct a
statement that he just made in response to the last
question.
Dr. Farone?
THE WITNESS: I misspoke. It was if it didn't
have the cardiovascular effects. We want it to have the
central nervous system effects.
If you could do that, then in fact you would
have the basis on which to make a safe cigarette, and that
is very much like what Dr. DeNoble was talking about in

his recent discussions with the press. It's very much
like Eclipse, very much like Premier, very much like
programs of similar types of smoking articles that have
been talked about in the industry. So I don't consider
that anything, you know, horribly different.
BY MR. BHATIA:
Q Do you consider these products to be
conventional cigarettes or alternative smoking devices?
A Well, that gets us into a discussion of what
a conventional cigarette is.
I mean you have -- a conventional cigarette
is based on a time frame. The conventional cigarette of
1990 to 1997 is different than the conventional cigarette
of 1890 to 1897.
Q Well, do you consider this product to be more
like Premier or more like the Marlboro that's at the
grocery store?
MR. SHUB: Object to the question as vague, what
"this product" means. It's vague.
THE WITNESS: Assuming we're talking about this
hypothetically safe cigarette, it would end up being more
like Premier or Eclipse than like Marlboro.
BY MR. BHATIA:

Q What evidence do you have that smokers would accept that alternative cigarette?

A Well, there's a sort of similar product on the market that the -- I believe it's Scandinavian. I've read pharmaceutical concerns. It's been approved by the FDA for use in smoking cessation programs. It's an aerosol that's about the size of a cigarette or maybe a little bit bigger, and you sort of manipulate it in a way that you can give yourself a little dose of inhaled nicotine aerosol whenever you need it. And that, according to the data, appears to be very well accepted by those people that are using it as a substitute for a cigarette. That's why it was approved by FDA, I believe.

Q Well, the product is used for people who want to quit smoking; correct?

A That's why it was submitted to the FDA. That's correct.

Q Well, what evidence do you have that people who want to continue to smoke cigarettes will, instead of smoking cigarettes, smoke this alternative cigarette device?

A Well, the basis is that if they use it at all as a replacement for cigarettes and it works and gives them the same pharmacological effects for which they smoke cigarettes, then they will in fact continue to use it. They could decide to stop or wean themselves from it, or they could continue to use it. As a matter of fact,

that's one, possibly, of the concerns with such products, because it still has the cardiovascular effect. But if we took that same product and eliminated the cardiovascular effect, I don't see any problem with having people use that as a continued way of satisfying the pharmacological need.

Q The Premier product introduced by Reynolds was not a commercial success; correct?

A That's my understanding.

Q And the current product on the market from Reynolds, the Eclipse product, has not proven to be

a
commercial success as yet either; right?
A I don't know the statistics on what Eclipse
is doing.
Q Your hypothetical safe cigarette, what evidence do you have that smokers in the marketplace would
in fact accept it?
A It's a hypothetical case, so it's hypothetical evidence.
Q Okay. And to make this hypothetical safe
cigarette, at a minimum you would need the nicotine analogue that had none of the cardiovascular effects of
nicotine but all of the central nervous system properties
of nicotine that smokers wanted, right?
A I'm not sure. I don't think so, because in

that statement that you just made, the question is the --
all of the properties that nicotine has other than cardiovascular, I'm not sure we know exactly what all of
those are. Let's just say a sufficient class that you
would satisfy the user of the product. And that apparently almost every cigarette company and every tobacco company thought was the case because that's why
they embarked on these programs.
Q Well, if the analogue that you have described
could not be made, then you would agree, wouldn't you,
that the hypothetical safe cigarette couldn't be made;
right?
A Yes, I would agree.
Q Now, when you discussed the concept of this
safe cigarette with plaintiffs' counsel, what did they say
to you?
A Nothing.
Q Nothing at all? They sat there in shocked
disbelief?
A No. "Interesting."
Q So who were you discussing this with?
A Let's see. I think I talked it over with
Mr. Sheller. I don't recall whether Mr. Shub and I discussed it.
Q And Mr. Sheller's only statement to you was

"Interesting"?
A I don't remember him reacting much more than

that.
Q Have you discussed your idea of a safe cigarette with Dr. DeNoble subsequent to our prior deposition?
A No.
Q Have you discussed it with Dr. Uydess?
A No.
Q Have you discussed it with anyone other than plaintiffs' counsel that you have identified?
A Yes.
Q Who?
A People within my company that work with me. My wife. Probably people that I've talked with for various business meetings and things of that type since that time.
I don't remember the full range of people that I may have discussed it with, but people not involved directly in any litigation.
This is just as a -- it is a scientifically interesting and valuable thing to discuss. So, yes, I have talked about it because I don't think it's a matter of confidence or privilege or -- it's my concept, scientific concept.

Q Is your wife Cynthia O'Donohue?
A That's correct.
Q Has plaintiffs' counsel in any of the tobacco litigation ever suggested to you that it would help the litigation if you could come up with ways to make safer cigarettes?
A Well, plaintiffs' counsel, as I wrote that -- the reason why we are here, I believe, is I was asked to opine on the type of safer cigarettes. You probably know that I've discussed that with NBC. I've discussed that with anybody that is interested in the subject, that I believe that in fact safer cigarettes are a good thing to do. I believe that that's the way to provide smokers with what they want without causing disease. I mean I'm in favor of the safer cigarette. It's something I've been interested in for a long time, so, yeah, sure, I discussed it with them.
Q Other than what we have talked about,

have
you done any additional work on your opinions in this
case?
A This stack of documents here? Is that what
you mean by "other than what we have talked about"?
Q Yes.
A No.
Q Now, you provided me with a stack of

documents last week; right?
A Correct.
Q And those documents reflect additional work
that you had done on your opinions in this case;
correct?
A Correct.
Q We have talked about one of those documents,
which was Exhibit 17; right?
A Correct.
Q What other additional work have you done
other than Exhibit 17 on your opinions in this case
since
our last deposition?
A Well, the stack of documents that sits on the
table in front of me that I sent you last week.
Q You just reviewed them?
A Yes.
Q Did you write anything else?
A Yes, I did.
Q What did you write?
A I wrote a little discourse on the safe
cigarette.
Q Okay. Let me show you -- we'll mark it as
Exhibit 18.
Let's take a look at Exhibit 18 for a
second.
In your design of a safe cigarette, one would

need technology to heat the material to which this
hypothetical analogue has been placed; right?
A One would need a way, yes, of providing heat
to volatilize it and any other flavorants that you
wish to
do.
(The document referred to above was
marked Defendant's Exhibit No. 18 for
identification by the Certified Shorthand
Reporter and is attached hereto.)
Q What technology would be used to
accomplishing that electrical or chemical heating of
the
hypothetical nicotine analogue?
A I mean the list is extensive of things one
could do. Any chemical reaction, for example, which

is
what we call exothermic -- i.e., gives up heat when it
occurs -- could be used if the heat was sufficient to
volatilize these compounds and direct them to the smoker.
Q Okay. Would this be technology similar to
what Reynolds used with Premier?
A It could be, yes.
Q And when did Philip Morris obtain -- or
strike that.
When did Reynolds introduce the Premier
product? Do you remember?
A I believe it was -- my recollection is

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'90 or '91. I'm not quite --
Q So at least by '90 or '91 that technology had
been developed sufficiently to allow it to be used in an
alternative cigarette device; correct?
A That particular technology, yes.
Q Okay. Now, did Philip Morris have any
technology similar to Premier for burning this
hypothetical nicotine analogue?
A It is my understanding that they did. That
was -- but we have to recall that during the time I was
there those were very secret kind of research projects
that were going on to which I personally was not privy.
So I can't say exactly what they may or may not have had.
Q Okay. So, you never saw any of the
technology for heating the hypothetical nicotine analogue
while you were at Philip Morris; is that right?
A Well, I don't know what you mean by "see."
We discussed it. We talked about ways to do it, people
working for me, you know, the temperature at which these
things would volatilize. We had made heat systems that
would do it, but I never saw a working prototype product
that would do it, if that's what you mean by "saw."
Q Who was working on the development of this
prototype project?
A The people that were working for me or

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generally through the organization?
Q Who was in charge at Philip Morris?
A I believe Tom Osdene's group was in charge of

that.
Q Would Cliff Lilly have been involved in this effort?
A He probably would have. He worked for me, but he was involved in many projects that I was not totally aware of what those projects were.
Q What is your opinion of Dr. Lilly as a scientist?
A Obviously, I thought very highly of Dr. Lilly. I wrote many promotion recommendations for him.
Q Is it your understanding that Philip Morris has been working on technology to burn tobacco in a controlled manner and at a different temperature in order to reduce some of the harmful components of smoke?
A It is my understanding that Philip Morris has worked on a wide variety of delivery mechanisms, not limited to burning. You know, sparging with gases, all kinds of things, yes.
Q And is it your understanding that Dr. Lilly was involved in much of this effort?
A Well, up to the time I'm aware of from '76 to

'84 he was involved, as I was, actually.
Q Okay. What evidence do you have that Philip Morris had the technology to successfully market a device that would heat this hypothetical nicotine analogue prior to your leaving the company?
A The -- we had many discussions about whether or not to apply for patents on many of these different things, not all of which I was really certain what we were talking about with these different things because of the secrecy aspect, but my understanding of our ability to do that was -- is based partially on the fact that it had got up to the point where the desire to patent them was a real issue.
Q As a scientist, do you patent processes or devices that are technologically feasible?
A That's one of the definitions of the reason why you have to -- it has to be technologically feasible.

18 It has to have utility before you can apply for a patent.
19 Q Is there a distinction in patent doctrine
20 between technological feasibility and commercial
21 feasibility?
22 A No.
23 Q Do you believe that all devices on which
24 patents are obtained are commercially feasible?
25 A Of course not.

1 Q So there is some distinction between
2 technological feasibility and commercial feasibility;
3 correct?
4 A Yes.
5 Q What evidence do you have other than the fact
6 that patents were contemplated for certain technology that
7 such technology was commercially feasible?
8 A Commercial feasibility I can't speak to
9 because I don't know how far the programs were developed.
10 But if you're asking my opinion, I think you could do
11 it.
12 Q If Dr. Lilly were to testify that in the
13 early 1980s Philip Morris did not have the ability to
14 commercially market a device that heated this hypothetical
15 nicotine analogue, would that change your view that Philip
16 Morris could have introduced in early 1980 this safe
17 cigarette that you've described?
18 A No.
19 Q Why not?
20 A Because testimony in litigation isn't the
21 same as scientific discourse. If I could talk to Cliff
22 and we had a blackboard where we could go up and outline
23 why he concludes that that wasn't the case and I could
24 present my arguments why I believe it was the case,
25 Dr. Lilly may in fact be able to convince me that he was

1 correct. But simple testimony, you know, the way that
2 it's limited to your understanding of what's going on
3 probably wouldn't do it for me.
4 Q What are your arguments in favor of why
5 Philip Morris could develop a device to artificially heat
6 or burn the hypothetical nicotine analogue and that such
7 device was in fact commercially feasible?

A First, we know how these compounds volatilize. We study them all the time. So we can in fact determine the temperature profile, the heating rates that you require to be able to volatilize them without pyrolizing them or without combusting them. I mean that's known.

One way of knowing that is through a process or technique called thermogravimetric analysis where we look at how the heating rates cause the stuff to be volatilized.

We had done a lot of work on sparging where you blow air through it to remove compounds.

It's even possible that without heating it that you could deliver the product. If the volatility was correct, you just put it in a device and you just suck through it, and at room temperature the flow of air could cause the volatilization. That technology didn't require a heating device and certainly was available.

We actually tried sucking on things that had been doctored up with various chemicals to see what the effects could be, and it seemed to work. So heating isn't a prerequisite for this device. It's just one way of doing it.

Q And these projects are things that you personally worked on?

A Personally involved in and, you know, we got around that before. We don't necessarily have to be at the bench doing the stuff day in and day out to either be an inventor, write up the articles or anything. People worked for me, and I reviewed the work they did.

Q In Exhibit 18 you say that to volatilize the hypothetical nicotine analogue, you would need some form of electrical or chemical heating; is that right?

A I say that, yes.

Q Okay. Is that your opinion?

A Well, that's based on the assumption that it's like nicotine. If it was not like nicotine, then you don't need it. I mean that's based on assuming that

it's
going to have the delivery properties of nicotine but without having the cardiovascular effects. You could broaden this out.

Q Well, is this hypothetical nicotine analogue like nicotine or not?

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A It's -- no, it's not like nicotine because it doesn't have the cardiovascular effects.

Q What are the other chemical properties of it, for example, the thermodynamic properties?

A If we knew exactly what they were, I could tell you.

Q Could you draw the nicotine molecule for me?

A I believe I can.

Q Can you draw this hypothetical nicotine analogue for me?

A No. I would start with pyridine and start modifying it.

Q Well, do you know what this molecule looks like that Dr. DeNoble has described?

A I think I do because I have structures of all the analogues that have been synthesized.

Q Why don't you draw the nicotine molecule in your hypothetical nicotine analogue so we can just record it.

A I cannot draw you the hypothetical nicotine analogue.

Q Well, let's start with nicotine.

A (Witness complied.) Something like that. I don't remember. I'm not an organic chemist.

Q Can you just write in "nicotine"?

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A I'm not going to write it because I'm not sure that's what it is.

Q So you can't draw nicotine?

A It has a pyridine ring and pyrrolidine ring connected by a bond in between. This isn't a test of my memory, as I understand it.

Q I understand. You don't need to be defensive.

A Well, I'm not being defensive. I'm not going to label it.

Q You don't know -- just so it's clear, you're

not certain that what you've just drawn and what we're going to mark as Exhibit 19, you don't know whether that's nicotine or not; right?

A Not without checking against all the other structures.

(The document referred to above was marked Defendant's Exhibit No. 19 for identification by the Certified Shorthand Reporter and is attached hereto.)

Q Okay. And you certainly are incapable of drawing this hypothetical nicotine analogue that Dr. DeNoble has described?

A Not -- I --

Q So that's Dr. DeNoble's analogue?

A It's going to be a nicotine analogue, 3-methyl, 4-methyl, one of these things, and we normally put an X there to let you know that could be anywhere on the ring. And I have papers that describe all of these, the patents that Philip Morris had. I think I gave you references to some of those. But basically I did not come here today prepared to take a test in organic chemistry. If you want me to do that, I'm perfectly capable of doing it. The way I normally work is not to remember all the specific details but to remember the generalities and look up the specific details.

To put it in context, when I went to college and when I taught in college, all of the tests were open book.

Q Uh-huh. Sure. I'd love to go to that college.

A Clarkson University.

Q Other than Exhibit 18, have you done any additional writings on your opinions in this case?

A No, I have not.

Q You had indicated that maybe you wanted to find some citations for your expert report at your prior deposition. Have you done that?

A Citations for my prior report? I'm not sure what you are referring to.

Q In your testimony you said that one of the things you wanted to do was maybe go back through

your
expert report and find some citations in the supporting
published literature. Do you remember that?
A Well, I didn't recognize it was published. I
thought that's what I was doing by finding these documents
that I provided to you, things that would support the
testimony in those documents. I didn't realize it had to
be published.
Q Well, have you gone back to your expert report in this case and attempted to footnote it, to cite
it to any of the documents that you have reviewed?
A No, not specifically.
Q And all the additional documents that you've
reviewed you've produced to us?
A For this action, yes.
Q So we're clear, there may have been other
documents that you've reviewed since our prior deposition
for other cases that you have not produced to us; correct?
A Correct.
Q On the first day of your deposition you stated that the way to determine whether a cigarette is
safer is to put it through a battery of biological activity tests and have that data peer reviewed. I just

want to know what the various tests for biological activity are that you're familiar with.
A That I am familiar with?
Q Yes.
A We first break them down into the mode of
administration of the chemical to the animal.
Let's talk about animal tests and then talk
about human tests.
In animal testing we can take the chemical,
we can feed it to the animal, we can paint their skin with
it, and we can do it by inhalation. So there's three
different modes of administration to animals.
There are other tests that involve cell transformation where we have a Petri dish or some other
culture system where we're growing cells and we apply the
chemicals to those systems and we look for changes in the
cells. There's a wide variety of those. Probably you've
heard of the Ames test. The Ames test is one of

those,
19 But you can do it with cells of many, many different
20 types. So there's in vitro tests. There's in vivo
tests,
21 and there's human tests.
22 Q Okay. In terms of tests that are used
for
23 cigarettes, what are the ones that you're familiar
with?
24 A I'm familiar with the mouse skin
painting,
25 the salmonella assay, the Ames test, the hamster
embryo.

1 There's a bunch of them that -- I can't
2 remember everything right now, but there was also
3 inhalation tests. I think I provided for you some
4 articles that I got off the Internet that discuss
the
5 testing protocols for some of these including the
6 environmental tobacco smoke inhalation
carcinogenicity
7 test, so I'm familiar with all those.
8 Q If you conduct biological activity
tests on
9 cigarettes and you're attempting to determine which
of two
10 cigarettes has the lesser amount of biological
activity,
11 what do you do if the cigarette is better in some
tests
12 but -- and we'll call that cigarette number 1 -- but
13 cigarette number 2 is better in other tests. How do
you
14 resolve that?
15 A That requires open discussion among
everybody
16 who is involved in that kind of testing to determine
which
17 of those parameters are going to be more relevant to
the
18 human system.
19 Q Do you have an opinion on which of the
20 biological activity tests are more relevant to the
human
21 system?
22 A Do I have a personal opinion on which
ones
23 are more relevant?
24 Q Expert opinion.
25 A Okay. Expert opinion. It changes with

1 time.
2 Q Well, --
3 A I mean this is a consensus scientific
thing.
4 It's not something that Bill Farone or Jeff Seeman
or
5 any -- or Tom Osdene can opine on their own, you
know,
6 alone and say, "Okay, this is what it is."
7 There's a lot of correlation work that
needs

to be done between the results in those tests and the results that you see in human monitoring programs where you follow people, that things happen to them, they get cancer, they don't, whether they smoke or not smoke. And you relate those effects to the same effects in the animal tests.

So inhalation tests, of course, would be important. One of the industry's main arguments for years was that there weren't positive inhalation tests, which was not right, but if -- so they say that was the most important factor.

Q Getting back to my question, which test of biological activity do you think is most relevant to the human system? And if it varies over time, please tell me for which time period which particular test is most relevant.

A Okay. The ones that I consider to be the two most relevant tests are those which show on a molecular

biology level transformation of cells because that's the key to start off with. If chemicals don't transform cells in a variety of systems, then they're probably safer than those that do transform cells, so cell transformation tests and human experience.

Q Okay. Which cell transformation test do you think is most relevant to the human system?

A I don't think there's a single cell transformation test. The way I judge it, is let us say that I have protocols of seven cell transformation tests. After I eliminate artifacts in the tests that are due to the way they are run or the media that the cells are in, I should be able to find compounds that are negative in all of those tests if I'm going to consider that they're safe.

Q Well, focusing on safer, which was the question, --

A Right.

Q -- what do you do if in some cell transformation tests cigarette 1 produces less

biological
activity but in the other cell transformation test
cigarette 2 produces less biological activity?
A Okay. There's two parts.
One is in the absence off correlative
data
with human testing -- let's take that one. Let's
assume
that we don't know what the relevance of any of
those

tests are to the human system. Then if I had seven
tests
and those tests were not developed randomly, that
they're
all developed to show, I would use statistics to
help me
determine whether or not if they were -- if one of
those
products was effective in one of the tests and was
safe in
six and the other was effective in five and safe in
two, I
think I would go with the product that was safe in
six out
of seven.
Q So for you it's just going to be a
"majority
rules" proposition?
A Only in the absence of correlative
human
data.
Q How does one obtain correlative human
data on
proposed changes to cigarettes?
For example, I'm a cigarette company,
and I
want to see whether adding a certain substance to my
cigarettes increases or decreases the biological
activity
of the cigarette.
A Yes.
Q How would I go about getting human data
on
that addition?
A Okay. That's a relatively
straightforward
proposition.
First of all, you go and look at the
data for
the individual ingredients. Worker exposure to
those

specific individual ingredients is a first nice
starting
place. That data bank is -- OSHA and other people
who do
that kind of thing have that data bank.
Q Does it have a name?
A There's many of them, toxicology
databases.
I mean there's dozens of them. Medline is one place
you

can go and start finding that kind of information. But that's one area you can go.

So if we know that there's -- that's why I gave you some of the papers I did.

If you know that there's 1,3-butandiol in cigarette smoke, we can go look up the name for -- look up the data on 1,3-butandiol.

Now, this may seem difficult because we know there's thousands of compounds, but that's the way you have to go about doing it.

So now we have the individual data. We start looking at dose response for the individual data to see what we can learn from that. It's also extremely important to start keeping track of the human experience by brand and by subcategories within brands so that we know by looking at the composition of the cigarette smoke from each of those brands, we can come up with a profile of what constitutes a safer cigarette.

Q Assume that I'm not willing to take the risk

of putting it into a brand unless I have additional data. Is the only place I can get data on the human experience these toxicology databases that you're referring to?

A No. I mean if you're starting with a new compound that you've synthesized, you don't know anything about it, is that the question?

Q Sure.

A Okay. Well, if you take a new one, there's a protocol for that. You start off -- you do the in vitro tests. You do in vivo tests. And if you're going to expose humans to it, you have to consider whether this is going to fall under, like, FDA or somebody's jurisdiction.

After you have enough evidence concerning the in vitro and in vivo safety of that material, you apply for an investigational new drug application, for example, to see if you can use that in humans to get some preliminary validity of your assumption that this is safe. So there is a protocol that pharmaceutical companies use

all the time to define things that are safe that are capable of being administered to people.

Q Okay. And all of this, of course, would need to be done before your hypothetical nicotine analogue could be introduced into cigarettes; right?

A Correct, in my opinion.

Q Well, we are here for your opinions, not here

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for my opinions.

A Yes, it would have to be done.

Q Do you agree that for a safer cigarette to be a commercial success, people would have to smoke it?

A For it to be a commercial success, the material has to get into the lungs or be absorbed through the buccal -- the mouth and some tissue to get into the bloodstream.

Yes, I agree, I mean, if that's what you mean by "smoke."

Q I asked you not about smoke. Let's try again.

Do you agree that for a safer cigarette to be a commercial success, people have to smoke it?

MR. SHUB: I object.

THE WITNESS: I think that's the question you asked before. What do you mean by "smoke"?

BY MR. BHATIA:

Q All right. I see your problem.

Do you agree that for a safer cigarette to be a commercial success, people have to buy it?

A Yes, --

MR. SHUB: I object.

THE WITNESS: -- I agree with that.

///

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BY MR. BHATIA:

Q And would you agree that you haven't really advanced the ball very much if you make a safer cigarette that no one in the world is willing to buy?

A No.

Q You don't agree with that?

A Huh-uh.

Q Okay. Can you explain to me how you reduce the risk of people getting a disease by developing a safer cigarette if no one in the world anywhere is willing to buy it and smoke it?

A Well, that wasn't -- the second question that you asked me, did I agree whether they had to -- there

were two parts to the question, but what I have in mind is that you could give it away to start off to prove to people that it's okay. You can advertise the benefit of it. I mean there's a bunch of things you can do that ensure commercial success.

Q Okay. If no one is willing to buy or utilize the safer cigarette anywhere in the world, has the cigarette company who introduced the product done anything to reduce the risk of smokers getting disease?

A Yes.

Q How?

A Because in trying to sell it, they have

advertised or they have stated that the other products are in fact risky, so they've educated the public as to what the risks are, and then the people can make an informed opinion as to whether they want to continue using the product that they have. So they've been very beneficial to the entire business because they'll end up with people who use their product who are truly informed of the risks of the existing product.

Q If nobody quit smoking regular cigarettes and continues to smoke them just as they did before, has there been any reduction in the risk of people getting disease?

A No.

Q Okay. Now, you keep talking about advertising products as being safer.

A Yes.

Q It's your opinion that cigarette companies -- for example, Reynolds -- should have advertised Premier as being a safer product?

A No, that's not what I said.

Q Okay. Is it your opinion that cigarette companies should advertise no-additive products, products that contain no ingredients added to them as being safer?

MR. SHUB: Object.

THE WITNESS: I didn't say that.

BY MR. BHATIA:

Q I asked you is that your opinion?

A No.

Q They shouldn't do that?

MR. SHUB: Object.
THE WITNESS: I'm not -- I mean there's a specific way that I think you do -- you bring to the public's attention the safer cigarette that works for everybody that makes sense. That's my opinion. The way you do that is to provide the cigarette and the information to independent bodies who look at the data, who study it. They write a report.
Let me give you an example of something I brought up while I was at Philip Morris. Suppose Lucky Sevens, a Japanese brand -- I think that's one of the major brands -- the Japanese were to issue a report which showed that the smoking per capita was much more in Japan but the cancer rates were much less, so this report is given out, and then what happens is they introduce the cigarette in the United States, Lucky Sevens from Japan, and they allow people to be aware of the information just by referencing it -- it could be an FDA information, could be public available information through the literature -- the people will then come to the conclusion, the users of this product, without the company making the

claim that it's safer, because that's always a risky proposition, to make the safer claim, but the information is available, the cigarette is available, so the informed public makes the connection.
Q Is that sort of like an implicit health claim?
A An implicit health claim? If we are talking about a state of affairs where this is all done in concert with the government it could be more than implicit because the claims could be approved. So then it would be an explicit health claim.
Q So to advertise these safer cigarettes, one would need the cooperation of the government?
A To advertise them directly, that's correct.
Q Okay. On the first day of your deposition you identified a number of ways in which you believe

that
17 cigarettes could be made safer. Do you remember
that?
18 A Yes.
19 Q Are there any additional ways other
than what
20 you gave me, Exhibit 18, that you left out on the
first
21 day of your deposition?
22 A Probably, because I mean I -- I don't
know
23 that my list included everything I was able to think
of.
24 It was what I was able to think of at that time.
But if
25 you're asking me can I think right now of any other
ones,

1 the answer is no.
2 Q So as you sit here today other than
what you
3 told me on day one of your deposition and what you
gave me
4 in Exhibit 18, you don't know of any other ways to
make a
5 safer cigarette?
6 A As of right now, that's correct.
7 Q One of the ways that you stated
cigarettes
8 could be made safer was if a cigarette was made that
9 replaced nicotine with a nicotine-like mixture or
10 combination.
11 Do you remember that?
12 A Yes.
13 Q And to make that cigarette you'd need
to make
14 a cigarette with a lower nicotine content so you
could add
15 this nicotine mixture or nicotine-like combination
to it;
16 right?
17 A It's a combination of ingredients that
would
18 enhance or replace the effects of nicotine rather
than --
19 the idea there is rather than a single chemical like
the
20 nicotine analogue, I'm going to do it with a
combination
21 of ingredients.
22 Q Right. I understand.
23 But what I was trying to get at was
before
24 you add this nicotine-like mixture to the cigarette,
the
25 existing nicotine in the tobacco would somehow have
to be

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1 either removed or reduced.
2 A Okay. I'll accept that.
3 Q You agree with that?
4 A Yes.

Q And you have identified two ways, as I understand it, in which to remove or reduce the nicotine in the tobacco.

The first was you take the nicotine out of the tobacco using the supercritical CO2 process that Philip Morris developed.

And the second was to try to grow tobacco that naturally had lower or reduced nicotine content.

Right?

A Well, there's an exception. I mean the extraction wasn't limited to what Philip Morris did. Any extraction process will do. You can use water. I mean you don't have to use supercritical CO2. I just use that as an example of an extraction process.

Q But the process we were discussing was supercritical CO2 extraction; right?

A I'm not sure.

MR. SHUB: That was the process you were discussing, Vineet.

BY MR. BHATIA:

Q What other process in your deposition on day

one did you describe to remove nicotine from tobacco?

A I don't know. I'm just saying that the principal or the unit operation involved is extraction. And the extraction with supercritical C02 was only one example.

You can use ammonia. You can use nitrogen. You can use water. We can probably use supercritical alcohol. There's any number of ways by which we can perform extraction.

Q Back to my question.

What other methods of extraction did you describe on the first day of your deposition?

A I don't have the deposition, but I recall -- I think we discussed a little bit about water extraction. I mentioned -- did I mention a device that Reynolds had where they did water extraction?

Q No, sir, you didn't.

A Okay. Well, that is one thing I'm aware of.

Q Philip Morris developed a cigarette that utilized supercritical CO2 extraction to remove nicotine

from tobacco; right?
A Yes.
Q And that process occurred after you had left the company in large part; right?
A The commercial product was developed after I

left the company.
Q Okay. And have you reviewed any of the research that Philip Morris conducted into the supercritical CO2 extraction process?
A I believe -- didn't I give you some of that information? I believe that was in the package that I gave you.
Q I don't think so.
A Oh, I think it was.
Q Okay. We've got it. Can you show it to me?
A Sure.
Q Start with these documents. Are they in there?
A No. It's in the --
Q Let's give him all of day one. You have the -- here you go, sir.
A Hang on.
MR. BHATIA: Let the record reflect that I'm giving Dr. Farone the documents he provided to me on day one of his deposition.
THE WITNESS: In these documents that I'm looking at, part of what I'm looking at are documents that describe runs that were made on analytical equipment that look at the effects of production of things like ammonia, acetaldehydes or aldehydes in general.

BY MR. BHATIA:
Q Well, I understand, and that's very nice, but what I asked you, sir, was what research did you review that goes to Philip Morris's supercritical fluid extraction process? If you just point the documents out to me, we can mark them as an exhibit.
A I'm looking for these. As I recall, in these, in the document I'm looking at, there is reference to -- here, I found one page. ART Model A. ART Model D.
Q Let's mark these.
A Let me keep looking. Here's more. Here's another one.

Q Uh-huh.
A Then there's the summary document.
Rather than take the time --
Q No, I want you to take the time.
A You do?
MR. BHATIA: Yes, sir.
We're going to mark these pages that Dr. Farone gives me as the next exhibit. I believe it's Exhibit 20.
Do you have any way of noting how long it takes him to review the documents?
(Whereupon a discussion was held off the record.)

MR. BHATIA: Why don't you mark the time now.

(Off the record from 11:28 a.m. until 11:32 a.m.)
THE WITNESS: That's another document.
MR. BHATIA: Okay.
THE WITNESS: Actually, this whole file on tobacco-specific nitrosamines is relevant.
(The documents referred to above were marked collectively Defendant's Exhibit No. 20 for identification by the Certified Shorthand Reporter and is attached hereto.)
BY MR. BHATIA:
Q I'm not asking for things that are relevant. I asked you to find me the research into Philip Morris's supercritical extraction process, the process itself that was used to extract nicotine.
A Well, I'm interested in the effects of the process.
Q I didn't ask you about the effects. That could be later in the deposition.
I want to know what documents you have looked at that discussed the process itself, the chemical parameters of the process.
A I don't have those documents. I don't have documents that describe the chemical parameters of the

process.
Q Okay. So just so we're clear, the only documents you have reviewed involving the supercritical CO2 extraction process deals with the effects of the process as opposed to the process itself; correct?
A That is correct.
Q All right. And while you were at Philip Morris -- strike that.

Do you know why the plaintiffs' counsel in the various cases from around the country didn't send you documents that relate to Philip Morris's process for extracting nicotine from tobacco using supercritical CO2?

A I have no idea.

Q Are you aware of research that Philip Morris did that demonstrated that the supercritical extraction of nicotine from tobacco fundamentally changed the structure of the tobacco and altered the way in which it tasted when smoked?

A Everything that you do fundamentally changes the structure -- in making cigarettes changes the structure and alters the taste. So, yes, I'm not surprised.

Q But the question is are you aware of that research that Philip Morris did?

A No.

Q And you've not reviewed that research then; correct?

A That is correct.

Q Are you aware of studies that Philip Morris conducted which demonstrated that smokers did not accept the taste of cigarettes that contained tobacco that had been extracted using the supercritical CO2 process?

MR. SHUB: I'm going to object to that. Are you making a representation that such studies existed in --

MR. BHATIA: Go ahead. You can answer the question.

MR. SHUB: Don't answer the question.

MR. BHATIA: You can direct him not to answer. That's your prerogative.

MR. SHUB: I'm asking you a question.

MR. BHATIA: I'm not answering your questions. I'm not here to be deposed.

MR. SHUB: Well, the question is based on --

MR. BHATIA: You want to depose me, issue a notice.

MR. SHUB: The question is based on a representation that such studies existed.

MR. BHATIA: I asked him a question, whether he's aware of or not, and he can answer that yes or no. So you're wrong again.

MR. SHUB: Well, I'm not wrong. It's not a question of right or wrong.

MR. BHATIA: Yes, it is, and it's a question of interrupting the deposition, one that we don't have much time to complete. So I would ask you to refrain and follow the case management order as I did the last time we were here.

MR. SHUB: Well, I'm going to object to the question.

MR. BHATIA: Then just object.

BY MR. BHATIA:

Q Do you remember the question?

A Yes.

I'm aware of studies that said it was acceptable, that smoking it was acceptable to consumers.

Q What studies?

A The ones that were referenced in the discussion in the popular press about why the product was introduced to the market, why it failed, and all the rest of it.

And I believe Philip Morris made representations to the effect they had tested it among consumers and it was acceptable, and that's why they put it on the market. So it seems if they had studies that said it was unacceptable, then somehow that's contradictory to what they stated publicly.

Q What are you referring to?

A The discussions about -- in the FDA information with regard to the reasons why the no-nicotine cigarette failed.

Q What FDA information?

A I don't remember the exact -- you asked me if I was aware, and I answered that I am aware. I didn't --

Q No. I asked you if you were aware of studies that showed that it was unacceptable.

A And I'm not.

Q So the answer is no, you're not?

A Right.

Q Okay. Are you aware that Philip Morris did tests using the supercritical extraction process in which they would extract tobacco and add back the extracted nicotine and then have internal smoke panels with Philip Morris employees smoking that tobacco to see how it

tasted?
MR. SHUB: Object.
THE WITNESS: I don't recall right now. I mean that's typical. I've seen so many tests in my time there and here that I wouldn't be at all surprised. But I cannot as I sit here recall a specific test on CO2-extracted material added back. I'm aware of the fact that it was added back.

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BY MR. BHATIA:
Q Right, but let's face it. The extraction and the add-back studies would have occurred after you left Philip Morris in 1984; right?
A For supercritical CO2. I mean Merit has some extracted --
Q That's what we're talking about. We're not talking about something else. We're talking about supercritical CO2 extraction.
A Okay. Fine.
Q So you wouldn't have seen the studies while you were at Philip Morris?
A Correct.
Q And since that time no plaintiffs' counsel from around the country sending you documents has sent you those documents; right?
A That's correct.
Q So you're not aware of those studies; correct?
A Only through the popular press, like I said. I'm not aware of the negative ones, correct.
Q But it's your testimony then that in the popular press it was reported that Philip Morris did work to extract the nicotine and then add back the extracted material and then had internal smoke panels smoke it?

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A No. It's my testimony that --
Q Well, that's what the question was.
A Okay. Then the answer is no.
MR. SHUB: Are you going to let him finish his answer?
MR. BHATIA: I'm not going to let him be nonresponsive, no.
MR. SHUB: Well, then, move to strike it, but let him finish his answer.
MR. BHATIA: I'm not going to move to strike. I'm

going to move forward in my deposition, and you can object.

MR. SHUB: It's very rude --

MR. BHATIA: It's not rude.

MR. SHUB: -- to cut him off.

MR. BHATIA: What's rude -- I don't want to get into an argument with you again.

MR. SHUB: Well, don't cut him off. That's my point.

MR. BHATIA: Well, don't interrupt him. Don't coach him. Follow the case management order.

MR. SHUB: Don't cut him off, Vineet, like you just did.

BY MR. BHATIA:

Q Just so we're clear, you have not seen

studies in which Philip Morris extracted the nicotine from tobacco, added it back, and then had internal smoke panels smoke that tobacco; correct?

A That is correct.

Q Now, another way you believe that nicotine could be removed from tobacco is genetic engineering; right?

A That's correct.

Q And you are aware that Philip Morris had a program at Calgene to attempt to genetically engineer a reduced-alkaloid tobacco plant?

A That's correct.

Q Who was in charge of that project?

A I don't know.

Q Was that project ongoing while you were at Philip Morris, or did it occur after you left Philip Morris?

A We had a separate one with Crop Genetics International while I was there.

Q I asked you about Calgene.

A No, I'm not aware of who was in charge or -- that happened after I was there.

Q So the project at Calgene started after you were at Philip Morris?

A That's correct.

Q And you don't know who was in charge of the project?

A At Calgene?

Q No, at Philip Morris.

A No.

Q You don't know who at Philip Morris --

A Correct.
Q -- was in charge of the Calgene project?
A That's correct.
Q Okay. You've got to let me get the question on the record.
A Sure.
Q Thank you.
She can't take down the answers if they come in between.
MR. SHUB: Just --
BY MR. BHATIA:
Q Are you aware of studies at Philip Morris that demonstrate that the Calgene process to reduce the nicotine in tobacco was not inheritable in subsequent generations of tobacco plants?
A No, I'm not.
Q The plaintiffs' counsel in this case didn't send you those studies; right?
A I don't recall any studies.

Q Now, you said at your prior deposition that you spoke to Ved Malik, and he told you that he thought genetic engineering of tobacco to reduce nicotine could be done; right?
A A little more specific. He said that it had been done.
Q Okay. When did you speak to him?
A A year ago? It was quite a while ago.
Q What was -- go ahead, sir.
A We have -- we have a project for making cyclosporin that Ved has been a consult to us on. As you probably know, he works for USDA and -- well, anyway, he's been a consultant to us for the cyclosporin project, so that came up in the context of other genetic engineering work that had been done, and he indicated that publications from North Carolina State University covered similar information.
I had asked him if there were any published references to that, and I haven't had an opportunity to go look up all the literature on it. But that's what information he gave me.
Q So it's your testimony that Dr. Malik gave you some published references from North Carolina State

that demonstrate that the genetic engineering of tobacco to reduce nicotine was possible?

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A Well, we all knew that. It was done actually earlier than the North Carolina State. It's a question, I believe, of whether the trait was inheritable we were talking about.

Q Okay, sir.

Where are these North Carolina State publications?

A I didn't look it up because it's -- see, we knew when I was there that you could do low-nicotine tobacco. That's been known for a long time. As a matter of fact, some of the documents I gave you, I believe Caroline Levy used it in some of the testing they did.

Q Where are these cites today to the North Carolina State publications that demonstrate inheritability?

A I did not look it up.

Q Did you keep Dr. Malik's citations?

A He didn't give me any citations. It was a telephone conversation.

Q Okay. Did you discuss anything else in this conversation with Dr. Malik?

A Yes.

Q What else did you discuss?

A The method of increasing the rate of production of cyclosporin from the cultures that we had in

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house, that we were trying to increase the rate of production of cyclosporin.

Q What is cyclosporin?

A Cyclosporin is a drug that sells for $30,000 per kilogram that's a -- it's given to people to diminish their immune system during organ transplants. It's also given as part of AIDS treatment. It's also used in ophthalmic applications to decrease the idea of rejecting transplanted corneas and things of that sort.

Q Now, at your prior deposition you said that you also thought the genetic engineering work was possible because of a discussion you had with AgriCetus, A-g-r-i-C-e-t-u-s.

A That's correct.

Q What's AgriCetus?

A AgriCetus, as I think I may have testified

before, is the joint venture between Cetus Corporation and the University of Wisconsin. I think it's subsequently been bought out, but at the time I was at Philip Morris I was directed to that work by Mr. Weissman who was the -- I think he's the brother-in-law of Cliff Goldsmith, something like that. It was a contact that came down from New York that said we should discuss with AgriCetus the work they had done about genetic modifications of tobacco.

Q Who did you speak to at AgriCetus?

A I do not recall.

Q Did you speak to AgriCetus about Calgene's work?

A No. Calgene happened much after that.

AgriCetus was in the time frame of 1976 to '84, probably closer to '82, actually.

Q Okay. All right.

The next thing you say that needs to be done to make safer cigarette is to remove all the nitrates that are naturally present in tobacco; right?

A Minimize the nitrates.

Q Reduce them?

A Yes.

Q And the way in which you say this can be done -- well, I'll just stop for a second.

Where exactly are the nitrates in tobacco?

A I'm not sure if I understand the question.

Q Well, I mean --

A If they're in tobacco, that's where they are.

Q But where in the tobacco?

A In the cell structure? I don't understand what level of detail you're interested in.

Q Well, the cell structure is a start.

I mean the nitrates aren't sitting on top of the leaf, are they?

A Some of them are.

Q Some of them. But where's the rest of them?

A The primary part is inside of the -- it's bound to the cell wall.

Nitrate is what we call an anion. In order for it to be compatible with the laws of nature,

it has to have a cation, so-called, that's with it. And so it will be bound to a cation or a cationic site inside the tobacco. It's water soluble, so it's relatively easy to remove.

Q What percentage of the nitrate is in the cell structure of the tobacco as opposed to on the leaf surface?

A The majority of it is in specific parts of the cell structure which are the pathways by which water was normally transported, but it's throughout the cell structure.

Q Can you answer my question?

A Percentage?

Q Yes.

A It changes. It depends on the type of tobacco. It depends on --

Q Pick a type.

A I'd say take burley, for example. Probably 98 percent is in the structure as opposed to on it.

Q So 98 percent is in the cell structure, and only 2 percent is on the surface; correct?

A And when we say "in the cell structure," I don't necessarily mean inside the walls of individual cells. Could be trapped between cells.

I mean we're talking about a piece of tobacco and whether it's inside that piece of tobacco and whether it's sitting on the surface.

Q So it's inside the tobacco. It may not be in the cells themselves, but in the cellulose structure of the tobacco plant; correct?

A I'll agree with that.

Q And your idea of how to get it out from inside the cellulosic structure of the tobacco plant is to either use some kind of water-extraction process or use microbes that are somehow applied to the tobacco; is that right?

A Yes. There's three ways to do it. And one is think of the leaf. This is long before it gets to the tobacco company. It could be done at the tobacco company. But the idea is that during the curing process you have

the opportunity to remove it because in some curing processes, for example, in Oriental, Turkish, it's reduced automatically by the microbes.

So if you have a little bit of water -- it

doesn't have to be sopping wet, but you have to have enough, 20 percent say, 10 percent, to allow the nitrate to transport, to move to the surface where the microbes are -- by diffusion, since you have long periods of time during the curing process, you can essentially reduce it to very low numbers.

Q So there are three ways. One is to have a little bit of water and cure the tobacco like you would cure Oriental.

Two is to get it sopping wet, extract the nitrate from the water solubles, and then apply back the remaining water solubles.

And three is to treat the tobacco with microbes?

A No. Three is to change the horticulture in the tobacco so that it doesn't depot nitrate in the first place.

Q So three is some kind of genetic modification of the tobacco plant so that it does not uptake nitrates?

A Combined with agronomic practice changes so they don't use nitrate fertilizers in growing the tobacco because that's where a lot of it comes from.

Q Okay. I'm going to start with number one.

Do you have a name for these microbes you would use to apply to the tobacco?

A Well, I know the general classifications of the ones that work. They're bacillus, Alcaligenes and Pseudomonads. Pseudomonas, we're talking about genera of microbes that are known to use nitrate.

MR. HURWITZ: Could you spell last two?

THE WITNESS: Probably.

MR. HURWITZ: Probably can do it better than I can.

THE WITNESS: Well, Alcaligenes is A-l-k-i-g-e-n-e-s [sic].

Bacillus is -- you've got that one.

And the other one is Pseudomonas, which is P-s-e-u-d-o-m-o-n-a-s, I believe.

MR. HURWITZ: That wasn't a test. I just wanted to get them to write it down.

MR. BHATIA: It was good for the reporter. I was going to ask you to do it.

BY MR. BHATIA:

Q So it's your testimony that the microbes don't actually need to get inside the cell wall. If the microbes are used in a curing process similar to Oriental, you can leach the nitrates to the surface, have the microbes eat up the nitrates, and then the nitrates are gone. Is that right?

A Close.

There's a chemical process called diffusion

whereas if I eliminate some chemical in one portion of a mixture, the other stuff is driven by the concentration gradient. It will move towards where you eliminate it.

Q That's diffusion with an "i" and two "f's" as opposed to defusion with an "e" and one "f."

What does the tobacco cured in this manner taste like?

A According to some of the work we did -- there was also some work done at FTR -- it doesn't taste bad at all. Doesn't -- I mean it tastes like normal tobacco. I don't know.

Q Does it taste like Oriental?

A No. They -- no. The Oriental is just an example. As you know we did a lot of work on curing bright and curing burley and reverse curing them, so there's a lot known about the chemistry, the changes that occur. The trick is not to cause any negative changes during the process. But the fellow who did most of the work on this was Helmut Gaisch at FTR, did a lot of work on it.

Q So the person most knowledgeable at Philip Morris about this microbial process, in your opinion, is Helmut Gaisch?

A I didn't say that. He did most of the work on it. I don't know that he was most knowledgeable

because he's not a microbiologist.
Q Who, in your opinion, at Philip Morris is most knowledgeable about the microbial process?
A It's a group of people. Dan Teng was involved in it.
Walter Hempfling was involved at one point.
There's a whole group of people that were involved in it.
Ray Dawson, who was a consultant at that time -- I don't know if Ray's still alive -- but he was very interested in it and was involved.
Q Okay. Have you personally ever smoked tobacco that was treated with this microbial process to remove the nitrates?
A Yes, I have.
Q And when did you smoke it?
A Probably around 1979 or '78, something of that period of time.
Q How many cigarettes did you smoke?
A These were handmade cigarettes off of the little trial that I think Dan Teng did.
Q How many?
A Probably two or three only.
Q Two or three? That's all you smoked?
A Yes.

Q This test you're talking about, it actually involved using microbes as opposed to air curing bright tobacco, for example?
A Well, yes. It was using that air curing bright tobacco only as an example of how you could modify the chemistry if in fact the microbes changed it in some undesirable manner.
Q Did you ever review biological activity testing of the tobacco that had been treated with this microbial process?
A Probably.
Q Well, I thought at your prior two depositions you said biological activity testing was very sensitive and you weren't allowed to see it.
A But there were some reports that came out of the Biological Research Division that we did see,

and most
of the time the results were coded so that you didn't
know -- that's why I said "probably" -- so that you didn't
know what the results related to.
But, in fact, I believe that's one of the
things that we discussed with either Dr. Charles or
Dr. Osdene. I mean I'm pretty sure that I saw some of the
data even though the issue was sensitive because, like the
NOD process, the naturally occurring denitrification,
since we were involved in it and working in it, sometimes

that information would be shared with us.
Q So what do you remember about those
biological tests?
A I believe -- my recollection is that the
biological tests showed in a good number of those tests
that it was less active.
Q So you have a specific recollection of
biological activity testing of tobacco that had been
treated with microbes to remove nitrates; is that right?
A Yes, I believe I do.
Q And what test was used?
A I don't recall. It would have been one of
the cell level tests because it would have been test
results that were done in Richmond as opposed to INBIFO or
FTR.
Q How many test results did you see?
A I don't recall.
Q When were those test results performed?
A Between 1976 and 1984.
Q Eight years. That's pinning it down.
A Well, probably --
MR. SHUB: Is that a question, Vineet?
MR. BHATIA: Yes.
MR. SHUB: What's the question?
///

BY MR. BHATIA:
Q Can you pin it down any better?
A Yes. I think I can.
Would be between '79 and '82 would be the
most probable time for having seen those data.
Q And it's your best recollection that all you
saw was one cell level test?
A No, I didn't say that. They usually --
sometimes the information that we saw would be a score off
a battery of tests.

Q I'm not talking about sometimes. I want to know in this instance what do you remember seeing, if anything?
A I remember seeing the results of the tests.
Q What tests?
A Of cell level tests.
I don't remember whether it was the Ames test or one of the other cell level tests they were doing. Salmonella. I don't remember that right now.
Q Was it a single test, or was it a battery of tests?
A It was a battery of tests.
Q Do you remember a single one of the battery of tests?
A Not as I sit here.

MR. SHUB: Let's take a five-minute break.
MR. BHATIA: Any time you want to take a break.

(Recess)

BY MR. BHATIA:
Q Dr. Farone, just for the jury's understanding, these microbes are little living organisms; right?
A Yes.
Q And are they like bacteria?
A Yes.
Q And it's your view that what should happen is bacteria should be treated -- or all tobacco should be treated with this bacteria to remove the nitrates?
A No.
Q No? Okay. What is your opinion?
A My opinion is that portions of the blend which are high in nitrate need to be treated but that as we mentioned before, a lot of the portions of the blend are already virtually free of nitrates, so we don't have to treat them.
Q So with that qualification, can you tell me which portions of the blend are high in nitrates?
A Burley. Burley stems. Those are the high nitrate portions.
After you remove that nitrate, then we could

go back and see if it was reduced far enough.
Q If you treated the sheet process that utilized burley stem to reduce the nitrate in the tobacco

sheet, that would accomplish the same goal, wouldn't it?
A No, only to the extent that you remove that portion that comes out of burley stems where those burley stems are used in the sheet making process. But you have bandcast, which doesn't have it. Then, of course, you have the burley leaf tobacco which still has nitrate in it.
Q I was focusing, I thought, on the burley stem. Let me ask my question again.
If you treated the sheet processes that utilized all the burley stem -- okay?
A Okay.
Q -- that would accomplish the same goal of reducing nitrates; right?
A It would reduce nitrates, but I don't know if it reduces it enough. I think you have to treat more of the blend than just the burley stem.
Q I was focusing just on the burley stem.
A Burley stem.
Q You can either treat the stems or treat the sheet process that utilizes the stem; right?
A Yes.

Q You don't have to do it in both places; correct?
A No. If all the stem goes into the sheet-making processes, then you can treat it in the sheet-making processes.
Q And the other thing that needs to be treated is the burley itself?
A Yes.
Q Okay. And what evidence do you have that it would be commercially feasible to treat the great volume of tobacco that is utilized -- the great volume of burley tobacco and burley stem that is utilized to make cigarettes with microbes?
A Well, if we take an analogy from the stem -- from the RL treatment, the cost of doing the treatment is probably no more than -- is estimated to be about the same order of magnitude on the other portions of the blend. And there was evaluations done which showed that that was

economically feasible.
Q Okay. So it's your testimony that there was
analysis done by Philip Morris that demonstrated it was
economically feasible to treat all the burley tobacco that
is utilized in Philip Morris cigarettes with microbes?
A No, that's not what I said.
I said by analogy with the studies that were

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done on the RL sheet. There were economic evaluations
done on the RL sheet. I think I provided you a Susan
Dobberstein report in the box which does an economic
analysis of the means of treating the RL sheet to totally
remove the nitrate.
If you take that report and you extend it by
analogy to the burley, rest of the burley, then you'll get
an economic estimate of the cost of performing that
treatment.
Q Other than analogizing to the RL sheet study
that you're referencing, do you have any other evidence
that demonstrates it would be feasible to utilize microbes
on all the burley that Philip Morris uses in its
cigarettes?
A Yes, I do.
Q What other evidence do you have?
A Obviously, it works a little bit to a certain
extent on Oriental and Turkish, all of the Oriental and
Turkish. So I mean the point is in making these estimates
of cost, which I do all the time as part of my business,
it is my opinion that it would be economically feasible to
treat all of the burley.
Q Are microbes added to Oriental?
A They are indigenous to the Oriental.
Q So what is it about the Oriental process that

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allows you to analogize to the prospect of adding microbes
to burley and changing the manner in which burley is
cured?
A I didn't say we're changing the manner in
which it's cured. It's the manner in which it's stored.
You simply spray it before you send it off in

hogsheads to
the warehouse.
Q And who at Philip Morris is most knowledgeable about spraying hogsheads of tobacco with these microbes to remove nitrates?
A I don't know.
Q While you were there, who was most knowledgeable?
A I think I discussed that before. We had discussed this with Helmut Gaisch, the people from FTR; and, as I recall, Mr. Semp was involved in those discussions. Dr. Teng. Jerry Whidby may have been involved in those.
There's a bunch of people that were involved in those discussions, but I can't tell you who now is most knowledgeable in doing that.
Q Okay. And it's also your testimony that tests were done that utilized the process of spraying microbes on hogsheads of burley tobacco and then --
A I don't know --

Q Can I finish?
A Sure. Sorry.
Q -- and then analyzing the results of the microbial treatment?
A No.
Q That's not your testimony?
A It's not.
Q Okay. So what tests were done that involved actually utilizing the commercial manner in which the microbial process would be applied to burley tobacco?
A I -- my recollection is that we simulated -- or they simulated those tests so that they could take samples and run the analysis and that it wasn't on actual hogsheads. They were simulated hogsheads. It was in chambers, I believe.
Q What's "in chambers" mean?
A Well, instead of using a wooden hogshead, you construct a chamber which maintains the same environmental conditions as the hogshead so that you can monitor the course of the reaction as it goes on.
The FTR results that Dr. Gaisch did, I do not recall whether they put it in hogsheads or not.

Q Who conducted those tests?
A At FTR? I don't know.
Q Were all the tests conducted at FTR?

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A No.
Q Well, who conducted the simulated tests at Richmond?
A Either Dr. Teng or Mr. Semp.
Q When were these tests conducted?
A At the same time frame. I don't know. I don't recall exactly.
Q What time frame?
A '78, -- '77 through '80 or '81.
Q Now, as I understood it, the reason why you thought nitrates should be reduced in tobacco is to reduce nitrosamine formation in tobacco smoke; is that right?
A One of the reasons, yes.
Q And the other reason was to reduce nitrous oxide delivery in tobacco smoke?
A Yes.
Q And Philip Morris instituted a process at the reconstituted leaf facility called denitrification in which the nitrates were removed from the water soluble portions of tobacco that had been extracted from stems and other tobacco raw materials that were being used to make the RL sheet; right?
A No.
Q Philip Morris did not put in a denitrification facility at the RL plant?

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A Didn't remove the nitrates. Partially removed the nitrates.
Q Removed some of the nitrates?
A Correct.
Q How much of the nitrates did the process that Philip Morris utilized remove? Again, let me finish.
Now you answer.
A If I recall correctly, 70 to 80 percent, something like that.
Q And the patents that Philip Morris obtained for the denitrification process in fact acknowledged one of the reasons why the nitrates were being removed was to reduce nitrous oxide delivery in cigarette smoke; correct?
A Yes, that's correct.

Q And you reviewed those patents?
A Yes.
Q And it wasn't a secret that Philip Morris was trying to reduce the nitrous oxide delivery of its cigarettes, was it?
A No.
Q And it was in the patents, and those aren't secret; correct?
A That's correct.
Q And was there anything in the patents for denitrification that talked about nitrosamines?

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A I don't recall. I haven't reviewed them recently. I don't think so. But it may have been because we --
Q Okay. Because one added benefit of reducing the nitrates in the RL would be to reduce nitrosamine formation in the smoke from the reconstituted leaf.

That's a correct statement of your opinion; right?
A That's correct.
Q Now, to prevent nitrosamine formation in smoke, you need to remove the -- what you call the nitrosating agent; is that right?
A I can generally agree with that, yes.
Q Okay. Nitrosamines exist in tobacco in the filler itself; is that right?
A There are indigenous nitrosamines that have been formed during curing, yes.
Q And I've seen it referred to in the literature that the nitrosamines that are naturally present from curing are distinguished from those that result from pyrosynthesis; is that right?
A I'm not -- I don't think that's a correct characterization. You have more -- I mean there are some that are in both classes. The ones that are tobacco-specific nitrosamines can be indigenous. Some

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more of the same tobacco-specific nitrosamines can be made by pyrosynthesis.
Q In tobacco smoke from a cigarette, what percentage of the nitrosamines are the result of the endogenous nitrosamines, and what percentage result from pyrosynthesis?
A It's in that stack of documents that we

were
just looking at.
From memory I'd say it's about -- it's in the
40 to 60 percent range or half or something like that.
Q So about 50/50?
A Something like that? 60/40.
Q So somewhere between 50/50 and 60/40 endogenous versus pyrosynthesis?
A And it depends on the type. The NNK is much more pyrosynthetically. The nitrosonornicotine, I think there's a higher percentage that are indigenous.
Q Did you say "indigenous" or "endogenous"?
A Endogenous. Whatever. Inherent in the tobacco. Okay?
Q Now, does the burning of amino acids in tobacco produce a nitrosating agent that could cause nitrosamine production in the smoke?
A Any amine can cause nitrosamines given the right chemical conditions. So, yes, protein amino acids

are a source of nitrosamines which is why we normally differentiate between tobacco-specific nitrosamines and nitrosamines generally as a class.
Q There are amino acids in tobacco, though; correct?
A That is correct.
Q And let's say you could get all the nitrates out of tobacco --
A Okay.
Q -- but you still had amino acids. Do you have any estimate of how much the nitrosamine level in smoke would have been reduced?
A Yes. About 99 percent or better.
Q What do you base that on?
A I base it on the results of these reports that we just got through looking at where they talked about making it virtually free of nitrosamines if they're removed. Two things. The alkaloids and the nitrosating agent, i.e., the nitrates.
Q Can you show me that report, sir? Was that the document we marked at the prior deposition? I think it was Exhibit 16. Was this the document?
A That's the document.
Q Okay. Can you show me the page that

refers
25 to virtual elimination of nitrosamines in cigarette
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1 smoke. Take a look at --
2 MR. SHUB: Wait a minute. Let him look
through it.
3 BY MR. BHATIA:
4 Q I think it's 2024843570.
5 Is that the page you're referring to?
6 A No.
7 Q Okay. What are you referring to?
8 A Page 2024843560.
9 Q What does the title say?
10 A "PM Research Results, Filler
(Endogenous)
11 TSNA."
12 Q Okay. Is that referring to
nitrosamines in
13 smoke or in the filler?
14 A It says, "Remove nitrate and TSNA..."
-- it
15 says, "Mainstream Smoke. Remove nitrate and TSNA
not
16 formed." And it talks about sources of nitrate
reductase,
17 microbial and tobacco.
18 Q Okay. But does this page refer to
filler
19 endogenous TSNA or TSNA in smoke?
20 A My understanding, it says "Transfers
into
21 mainstream smoke." We're talking about smoke here.
22 Q If you saw studies from Philip Morris
that
23 demonstrated that there was a reduction in
endogenous TSNA
24 but that reduction did not translate into reduction
in
25 smoke, would that change your opinion?
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1 A Well, yeah. I mean it could.
2 The problem is that what I see here,
like on
3 2024843570, it says, "Filler and smoke TSNA Levels"
and it
4 shows that it's, you know, decreased dramatically.
5 Q Is there some other document that
you're
6 relying on for your opinion other than Exhibit 16?
7 A My opinion with regard to the reaction
8 between amines and nitrosating agent?
9 Q No. No. I'm sorry. My question was
not
10 clear.
11 It's your opinion that if you remove
12 nitrates, you're going to virtually eliminate the
13 formation of nitrosamines in smoke; correct?
14 A The pyrosynthetic mechanism disappears.

15 Closely. Close.
16 Q So there will be a virtual elimination
in
17 smoke; correct? That's your opinion?

A Of those nitrosamines caused by pyrosynthesis.
Q Right. And my question is are you relying on any documents for your opinion other than Exhibit 16?
A I'm trying to remember all the documents in the set that I gave you. I think there are more documents that discuss this same issue. I'm pretty sure there are. The project Poldi and Tasso. And so it's not just this

document. No, I'm not relying solely on this document.
Q Poldi and Tasso are not studies of mainstream smoke, are they?
A The chemistry of nitrosamine formation is independent of whether it's mainstream smoke, car exhaust, or sidestream smoke.
Q So it's your testimony that nitrosamine formation in sidestream smoke and mainstream smoke involve the same chemical reactions?
A The same mechanistic chemistry, yes.
Q So doing something to control nitrosamines in mainstream smoke would have the same effect as it would in sidestream smoke?
A No.
Q Okay. I'm just wondering what the relevance of Poldi and Tasso is to mainstream smoke nitrosamine reduction?
A In chemistry the end state of the reaction between two species is thermodynamically predicted, determined. It's independent of the path by which you get there. There's another part of it which we talk about as kinetics, how fast it happens. So the thermodynamics is the same between sidestream and mainstream smoke, but the kinetics or the rate at which it changes it different.
Q What are the tobacco-specific nitrosamines?

A What are they?
Q Yes. Give me their names.
A Nicotine --
MR. SHUB: Asked last time.
THE WITNESS: -- nitrosamine ketone, NNK.
BY MR. BHATIA:

Q Okay. That's one.
A Nitrosonornicotine.
Q Do we call that NNN?
A NNN.
And then I think it's nitrosoanatabine. And I forget what the other -- I'd have to look up the name -- but the NAT.
There are also other -- that's the primary alkaloids. There's also -- you could have cotinine.
Q Is there something called NAB?
A Yes.
Q That's nitrosoanatabine.
A Yes, I believe so.
Q And there's something called NNA?
A There's a bunch of them that aren't --
Q And then there's something call NNAC?
A Yes.
Q Okay. What is the chemical precursor for NAB?

A NAB. That's the anatabine? No. That's NAT.
I have that list of chemistry. I don't -- haven't looked at it in a few weeks.
Q It's your opinion that the precursor for NAB is nicotine, or is it one of the minor alkaloids?
A I think it's one of the minor alkaloids, but I haven't looked it up recently, so I don't -- I don't do memory things very well. I explained that to you before. I'm used to having data in front of me when I make a conclusive opinion on something.
Q Which of the tobacco-specific nitrosamines is present in the greatest concentration in smoke?
A Depends on which studies you look at.
These data, the ones I have in this particular document, seem to indicate that NAT and NNN are present to a larger extent in burley than NNK.
Bright, it's the other way around. But if I add up the total nanograms per cigarette, I end up with that NNN and NAT is greater than NNK.
Q Okay. Now, I think you testified that if you eliminated nitrosamines from cigarette smoke you would eliminate 50 to 80 percent of the biological activity in cigarettes. Do you remember that?
A That was an estimate, yes.
Q Okay. And what do you base that

testimony

on?
A Discussions with Dr. Osdene and Mr. Charles
and Dr. Pages. And when we were doing the nitrosamine
program, I think we had discussions to that effect.

I think I mentioned we categorized the disease-causing compounds in classes. The nitrosamines
were at the top of the list followed by the aldehydes
followed by the benzo(a)pyrene and the polynuclear
aromatic hydrocarbons.
MR. SHUB: Known as PAHs?
MR. BHATIA: Boy, you're testifying more and more
these days, Jonathan.
THE WITNESS: Followed by things like cadmium,
polonium 210.
BY MR. BHATIA:
Q Dr. Farone, try to stay with me. We're going
to focus on TSNAs now, and I think the question was on
what do you base your conclusion that elimination of the
TSNAs would eliminate 50 to 80 percent of the biological
activity in cigarette smoke.
And I believe your testimony is it's based on
discussions that you had with Dr. Osdene, Dr. Pages, and
Dr. Charles.
A Plus the knowledge of -- if you just go out
and look at the toxicology of those materials, you will

fined that those are much stronger carcinogens. That list
that I gave you isn't just their opinions. It kind of is
a generic opinion of people who look at these compounds
and describe risks. Like, you can go to OSHA documents,
things of that sort, and you can get a risk of what these
cancer-causing agents are.
Q Now, in your prior testimony on page 83 you
said, quote.
"...at least we have taken out one very
significant class which from the internal
documents appears to account for 50 to 80
percent of the biological activity or the
carcinogenicity disease-causing potential of
cigarettes."

What internal documents are you referring to in that answer?
A Okay. I think in the set that I gave you -- now you're going to ask me to find it.
Q Yes, I will.
A I don't know that I can. But I have seen a document that they categorized, they gave rank by tests type scores, if you will, about how to make safer cigarettes, and that's one of the things that I recall.
And the other documents that I have seen that I don't have -- that I know I don't have copies of are the

results that Dr. Osdene showed me in his office relevant to the denitrosated sheets where we had the -- I think I mentioned to you before where he showed me results that purportedly came from INBIFO or wherever they came from of the amount of biological activity that we would reduce this by. So that's what I'm basing it on. I mean we can base it on many different things. But my understanding of all the Hoffmann work and the rest of it is that pretty much general agreement that the nitrosamines are the biggest problem.
Q Have you seen a study by Dr. Hoffman that says if you eliminate the nitrosamines you eliminate 50 to 80 percent of the biological activity in cigarette smoke?
A I'd have to go back and read his documents again.
Q Is that among the documents that you provided me? I didn't see it.
A I provided you some of his documents. I haven't reviewed them in the last month or six weeks, so I don't know whether or not it says that in there. I'd have to go back and read it to see if he said it.
He did make some estimates of the reductions that would be due to the nitrosamines. I recall that.
Q Okay. The study you saw in Dr. Osdene's office, it was a test of biological activity;

correct?

A Correct.
Q What test was it?
A It was a score off of a test. I don't know which exact test. I mean it's 1979. It was 18 years ago. I do not recall exactly which test.
Q Was it mouse skin painting?
A I don't know.
Q Was it Aims assay testing?
A I think I just said I don't know.
Q You don't know one way or the other what it was?
A Correct.
MR. SHUB: Third time, Vineet.
BY MR. BHATIA:
Q You said you also had discussions with Dr. Pages. Did Dr. Pages show you some tests?
A Well, Dr. Pages showed us lots of tests because he normally gave the presentations on the biological activity testing. I'm trying to recall now whether he gave any specific information on nitrosamines. I can't recall.
Q Okay. Now, you testified that there were three ways to reduce nitrosamine formation in cigarette smoke. You said supercritical fluid extraction; adding antioxidants to the filler; and blend modification. Is

that right?
A Those are three, yes.
Q And I guess there's a fourth which would be to remove all of the nitrates because that would eliminate the nitrosating element?
A And fifth to remove all of the alkaloids if you're talking only about the tobacco-specific nitrosamines.
Q Fine.
Would you use supercritical fluid extraction to remove the minor alkaloids like anatabine and anabasine?
A You could.
Q Is that -- are those minor alkaloids, anatabine and anabasine, alkaloids that were removed during Philip Morris's efforts to treat tobacco with supercritical CO2?
A I don't know.
Q Okay. Tobacco that is treated with supercritical CO2 reduced -- strike that.
In tobacco that was treated with

22 supercritical CO2, how much of a reduction of TSNAs did
23 one see?
24 A That's in this report in front of me.
25 Q Exhibit 16?

1 A 16, yes.
2 Q And how much is it, sir?
3 A Of course, it depends on the blend
4 constituent that one is using, but one of them says,
5 "Supercritical fluid extraction, virtually all filler TSNA
6 removed."
7 Q What page is that?
8 A 2024843570.
9 Q Okay. Now, that says "Filler TSNA"?
10 A Says "Filler and smoke TSNA levels."
11 Q Where does it say that?
12 A Third line is Filler and MS, mainstream,
13 smoke TSNA levels.
14 Q Right. But I think the result line -- I'm
15 not trying to quibble with you, just trying to understand
16 the document. The "Result" line says, "Virtually all
17 filler TSNA removed"?
18 A Correct.
19 Q And can you show me where you read that
20 virtually all mainstream smoke TSNA was removed?
21 A It doesn't say that.
22 Q Okay. So does Exhibit 16 -- and specifically
23 the document that has Bates Number 2024843570 -- does it
24 speak to the reduction in TSNA in mainstream smoke as a
25 result of supercritical CO2 extraction?

1 A Totally removing it in smoke is alone the
2 result of CO2 extraction?
3 Q Yes.
4 A No, it doesn't. I mean it does. It speaks
5 to a dramatic reduction. And then the document goes on to
6 say if you remove the nitrates, you don't form it. So if
7 I add to this the removal of nitrates, clearly these
8 numbers go down even lower.
9 Q If you saw studies from Philip Morris that
10 demonstrated that supercritical CO2 extraction removed
11 filler TSNA substantially but there was not a substantial
12 reduction in smoke TSNAs, would that change your opinion?
13 A It would contradict this report.

Q Would it change your opinion?
A I'd have to see it to know whether it changes my opinion.
Hypothetically, I'd have to see whether it was burley, bright, or what they did, what the nitrate level was, because if you jack up the nitrate level, then you can make it back. There's a lot of factors that go into this.
Q So as a scientist, you're open-minded enough that if you saw data and studies from Philip Morris that showed as a result of supercritical fluid extraction filler TSNA was reduced substantially but smoke TSNA was

not reduced substantially, you'd be willing to reconsider your opinions on this subject?
A I would be willing to reconsider my opinions and the way to go about constructing the safer cigarette.
Q In Exhibit 16 is there an assumption that nicotine is not a precursor to NNK formation in mainstream smoke?
A It's -- I think what it says, if I recall, was that it is not -- it's -- if you look at the second page, 2024843508, it talks about precursors.
Q Is that mainstream smoke?
A This is sidestream, the one I'm looking at.
Q I'm focusing on mainstream smoke now.
A Yeah, I understand the question.
I was just showing that chemically nicotine can be a precursor for either NNK or NNN.
Q Well, there's clearly reports in the literature by Hoffmann and others that say that nicotine is a precursor for nitrosamine formation in mainstream smoke; right?
A Yes.
Q I think you gave me one of those documents; right?
A I believe so.
Q What is your opinion about what Philip

Morris's position is on whether nicotine is a precursor for NNK formation in mainstream smoke?

MR. SHUB: What is his opinion on what Philip Morris's position is on that issue? Is that what you want to know?
MR. BHATIA: Yes.
MR. SHUB: His expert opinion on that?
MR. BHATIA: You can object.
MR. SHUB: I just want to make sure that was actually the question you intended to ask.
MR. HURWITZ: Wasn't that the broad subject of his expert opinion in this case with Philip Morris and --
MR. BHATIA: Well, you haven't objected yet. It's been two minutes, and all you've done is talk, not object. You must like the question.
MR. SHUB: I do.
MR. BHATIA: Excellent.
THE WITNESS: Okay. I think that I'm -- I'm not answering about -- we're answering about chemistry -- okay? -- and to the extent that I have Philip Morris documents, I'm using Philip Morris documents. But I also have other companies' documents. I've seen other companies' literature.
If I use this as an example of Philip Morris's opinion, I don't know where to go. It says here,

precursors, that nitrate level of tobacco is the single most important factor for smoke yields.
Unfortunately, it says that under "Published Literature on Nitrosamines (AHF)," so I don't know whether that's Philip Morris's opinion or not.
I really haven't been answering these questions based on what Philip Morris's opinion is.
BY MR. BHATIA:
Q Okay. That was the first question about Philip Morris's opinion, sir. So I'm glad you weren't answering them based on that.
That means you were following directions, answering the question you were asked.
MR. SHUB: I'm going to object. It's very vague as to what you mean by "that."
BY MR. BHATIA:
Q Does this document, Exhibit 16, assume that nicotine is a precursor for NNK formation in mainstream smoke?
A Yes, it does.
Q Now, supercritical fluid extraction,

it's
your opinion that supercritical fluid extraction reduced
substantially the TSNAs that were formed in mainstream
smoke; right?
A Yes.

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Q Okay. Have you ever seen studies of the
biological activity of the smoke condensate from tobacco
that was treated with supercritical fluid extraction?
A No, I have not.
Q Okay. I take it then those were not among
the documents that the plaintiffs' counsel sent you in
this case; correct?
A So far. That's correct.
Q And if the studies that Philip Morris did on
the tobacco that was treated with supercritical fluid
extraction demonstrated that the biological activity of
the smoke condensate from the extracted filler was no
different than the biological activity of regular
cigarette smoke, would that change your opinion in any
way?
A The only way it would change my opinion is to
say that if you're going to use -- if you're going to do
these things in isolation, that you may have to do them in
combination. In other words, supercritical -- if the
studies show that if I take out all the nitrates and I
added the organic acids and I removed the supercritical
and it didn't have biological activity, then it would
change my opinion.
My opinion is directed toward the manner of
making a safer cigarette. I'm not really interested in

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tests that are constructed to prove that one single factor
doesn't cause that to happen. You have to do a matrix to
show that you -- that it's not possible to do it.
Q I thought you testified that if you took
TSNAs out, the TSNA reduction alone would remove 50 to 80
percent of the biological activity; right?

A That's my estimate based on what I know right now.
Q That was -- you said that was not just your estimate; that was your expert opinion. Correct?
A Correct.
Q And if you have a process like supercritical fluid extraction which removes the TNSAs from smoke, yet when you test the biological activity of that condensate from the extracted tobacco, you find there is no difference in the biological activity, would that change your opinion?
A If it happened in all the biological activity testing, a wide battery of tests, it could.
Q And you haven't seen those studies because the plaintiffs' counsel has not sent them to you; right?
MR. SHUB: I'm going to object because that assumes plaintiffs' counsel has the studies, and I don't appreciate the implication.
MR. BHATIA: You can answer the question.

THE WITNESS: I haven't seen any -- I have not seen studies of that -- of TSNAs extracted -- of supercritical-fluid-extracted cigarettes which are then smoked and the condensate is put into biological activity studies.
BY MR. BHATIA:
Q Okay. The next way to reduce nitrosamine formation is to add antioxidants to filler; correct?
A Right.
Q And in your opinion what percentage of nitrosamines are eliminated as a result of the addition of antioxidants to filler?
And, again -- I'm sorry -- I'm focusing on mainstream smoke.
A What percentage of the nitrosamines or the biological activity?
Q Nitrosamines, sir.
A Okay. I think as evidenced in this document, they give you a statement of -- give you an estimate that the mainstream TSNA is reduced 20 to 40 percent.
Q And I take it that it is your expert opinion that through the use of antioxidants you can reduce TSNA

in mainstream smoke by 20 to 40 percent?
A I am not validating the exact percentages in here. It just indicates something which has been talked

about for many years, that, yes, you can reduce it. And the question is, in my mind, how much of a reduction is adequate to show a result. 20 to 40 percent, for example, may not be adequate to reduce human disease. But, in fact, there is going to be a reduction. This document says approximately 20 to 40 percent if you use some of them. Antioxidants, you might be able to get that up to 50. Some may only give you 10. But it's a range. And all this does is show that that methodology is one arrow, if you will, in the quiver of making a safer cigarette.

Q Well, what is your expert opinion on how much nitrosamines will be reduced if you add antioxidants to filler?

A My expert opinion is that if you add antioxidants to filler, you will reduce tobacco-specific nitrosamines and probably some of the volatile nitrosamines also.

I don't have data on percentages because that depends so much on the conditions that all of this takes place. It's not going to be the same, for example, on a Merit that it is in a Marlboro or any of those cigarettes. So you're asking for very specific results to a very complicated series of conditions. In my opinion, the issue isn't how much but whether.

Q So you don't have an opinion on how much;

right?

A I've given the opinion based on this document. And if other documents come to light, I can modify that opinion based on the scientific information I have at the time I'm asked to give an opinion. That's how.

Q I'm asking you to give an opinion. The time is now.

A The time is now. As of right now we can stick with the 20 to 40 percent because I have a document in front of me, but that does not mean that at the time of trial it's going to be 20 to 40 percent.

Q Well, presumably, if it changes, you'll let us know?

A Absolutely.

Q Thanks for your commitment.

How much antioxidant is needed to reduce nitrosamines by 20 to 40 percent?

A Some of that work goes back to the late '70s and there's patents even on doing that, and I do not recall -- I think we're talking about tenths of a percent in filler, but I'm not clear exactly.

Q Do you have an expert opinion as you sit here today on how much antioxidant in filler is needed to produce a reduction of 20 to 40 percent --

A No, I do not.

Q Can I finish?

A Sure.

Q -- of the nitrosamines in smoke?

A No, I don't.

Q Well, how does the tobacco that's treated with antioxidants taste when smoked?

A Pretty good.

Q You smoked it?

A Yes.

Q When?

A Back in -- when I was at Philip Morris, one of the things -- I noticed that one of the antioxidants they're using is an ascorbic acid derivative, esters of Vitamin C. To the best of my recollection, that's the patent I mentioned a few minutes ago, that this was described in the mid '70s and, in fact, we made up some cigarettes and tasted them.

Q Who made them up?

A They were handmade cigarettes. I don't know who -- we had a handmaking facility, and I don't recall whether Product Development was involved.

I think Cliff Lilly, Warren Claflin, a group of people that worked together on these things, had them made up, but I don't know who did it.

Q Who was in charge at Philip Morris of the program to add antioxidants to filler while you were there?
A I don't know.
Q Who was involved in it?
A I gave you two names. And it would be Dr. Tom Osdene's area, and so he would know who was involved. I don't know who was involved.
Q So the only people you can name is Lilly and -- what's the other man's name? I'm sorry.
A Claflin.
Q Can you spell that.
A C-l-a-f-l-i-n, Warren Claflin.
Q How many of these cigarettes did you actually smoke that contained the antioxidants?
A Vitamin C. One. Probably just one.
Q One.
Now, you don't inhale cigarettes because you have an aversion to inhaling; right?
A Correct.
Q So the way you smoke a cigarette is kind of different than the way everybody else smokes a cigarette; right?
A Are we talking about taste? I'm not sure I understand the question.

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Q Well, you don't inhale the cigarette; right?
A Yeah. I don't have any taste buds in my lungs, so I don't think that's relevant.
Q Can you answer my question?
A Yes.
Go ahead.
Q Do you inhale cigarettes?
A No, I don't.
Q Okay. So the way in which you smoke cigarettes is different than the way in which everybody else smokes cigarettes, or most people; right?
A Most people. Correct.
Q Okay. Have you seen any studies that demonstrate that smokers find cigarettes that are treated with antioxidants to be subjectively acceptable?
A I believe I've seen such studies.
Q What study?
A I think there were panel tests of the same type. If I smoked cigarettes, that means they made them up. And they were normally given to the in-house panel, of which I was a member at some points of that, to see

whether they were acceptable or not.
Before you would do anything of sending something outside of the company, you would first try them among smokers within the company. And so there might be

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six people or ten on the panel who would give it a thumbs-up or thumbs-down for further testing.
Q What panel were you a member of?
A The flavor panels.
Q What was the name of the smoking panel that you were a member of?
A I don't recall.
Q I mean the smoking panels have names; right?
A Not all the internal panels for experimental products had names.
Q How did you identify them then if you didn't have names?
A I don't know how it was identified.
I know that they kept track of who was on these different tests. They collected the data. This was preliminary to POL tests.
Q Is it your testimony that Philip Morris had smoking panels without names?
A No.
Q So the panels had names; right?
A Quite possibly.
Q I mean they needed to have names so you could identify them; right?
A Yes. I think they did have names. I don't know what the names were.

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Q Okay. From 1976 to 1984 which panels were you a member of?
A I don't recall specifically.
Q For which years were you a member of a smoking panel?
A Probably from '78 to '84. And the directors were not official members of every panel. We would participate in selected studies.
Q Did you get a vote?
A Yes.
Q So you were an unofficial member of a number of panels? Is that your testimony?
A Correct.
Q And you were an official member of at least one panel?
A Yes.
Q And you remember the names of none of

these
panels?
A That's correct.
MR. SHUB: Vineet, do you thing it's a good time
to break for lunch?
MR. BHATIA: No. I'm ready to keep going.
MR. BHATIA: Well, I didn't say whether you were
ready to keep going.
MR. BHATIA: Well, no, I'm not ready to stop.

MR. SHUB: Well, what time do you have?
MR. BHATIA: 1:00.
MR. SHUB: I think we're going to break for lunch
in the next couple minutes.
MR. BHATIA: Whatever you dictate.
BY MR. BHATIA:
Q Are any of the antioxidants that are added to
cigarette filler biologically active?
A Yes.
Q Which ones?
A Vitamin C.
Q Any others?
A I don't have the entire list in front of me.
Q Can you think of any others other than
Vitamin C?
A I'm trying to remember what's on the list,
but presumably most antioxidants are biologically active.
That sort of goes hand in glove.
Q Have you seen any biological activity testing
of cigarettes that have antioxidants added to filler
versus cigarettes that don't have antioxidants added to
the filler?
A I believe I have.
Q What tests?
A This goes back to when I was at Philip

Morris, and I believe those are in the project 2500
biological activity of smoke reports. And I don't have
those reports for this action now, but I do recall seeing
studies on that.
Q So this is yet other instance in which you
have seen biological activity testing at Philip Morris;
right?
A Yeah. You're asking me whether I ever saw
any, and while I was there I saw some.
Q What tests were run?
A I don't recall.

Q What were the results?
A The antioxidants showed promise toward reducing biological activity. That was the premise of the patent, I believe. There was a couple patents in the '70s.
Q Who obtained the patents?
A I have to go back and look at the list of -- I have a list of those patents. I think I gave you a list of several pages of patent references.
Q Get them out.
A I don't have them with me.
Q I gave you the documents.
MR. DUNSETH: I've got them over here.
MR. BHATIA: Give them back to him.

THE WITNESS: Do you have the TRCC reference book?
MR. BHATIA: I don't know what that is.
THE WITNESS: It's the book published by Philip Morris that covers all of the reports given at the Tobacco Research Chemists Conference from the '50s on out.
MR. BHATIA: I don't have it.
THE WITNESS: Did I --
MR. BHATIA: Do you have that book?
THE WITNESS: Yeah, I think I do.
MR. BHATIA: It may be one of the things we copied. I'm not sure. I don't think so.
BY MR. BHATIA:
Q But before I forget, when you say the tests showed promise, can you be a little more specific on that?
A Usually that refers -- I mean it does refer to a lowered biological activity score in one or more tests presuming that it isn't contradicted totally by a second test. We talked --
Q Lowered by any amount?
A By a significant amount in the test, which means statistically significant.
Q How much?
A Well, statistical significance doesn't depend on by how much. It depends on the average in the standard deviation of two numbers. If they are sufficiently far

apart, they are statistically significant even if one is 1 and the other is 1.01.
Q Oh, I understand statistical significance.
I'm asking if you have a reduction of

.00001
percent in biological activity and that reduction was
statistically significant, would that, in your mind,
demonstrate promise?
A It could if that was significant in that
test, yes.
Q So a reduction of 1 to the minus 6, in your
opinion, shows promise?
A It could if it's statistically significant.
Q Assuming it's statistically significant --
A Yes, it could.
Q -- any reduction in biological activity of 1
to the minus 6 percent shows promise in your definition?
A As long as it's statistically significant,
yes.
MR. BHATIA: Okay. Just so we're clear.
You can find the documents now on the
antioxidant patents.
MR. SHUB: I think this is a good time to take a
break.
MR. BHATIA: Let's finish while the question is
pending.

MR. SHUB: Well, Why don't you give him lunch to
look for them, and then we can ask the question when we
resume.
MR. BHATIA: Okay. How long do you want to break
for?
MR. SHUB: What time do you have now?
MR. BHATIA: Five after 1:00.
MR. SHUB: Why don't we shoot to get back here at
1:50. Forty-five minutes.
MR. BHATIA: That's very reasonable.
MR. SHUB: Okay.
(Lunch Recess from 1:05 p.m. until 2:05 pm.)
MR. BHATIA: Back on the record at 2:05.
MR. SHUB: Wonderful.
MR. BHATIA: We are waiting for Dr. Farone to find
the citation to the patent on the addition of antioxidants
to filler.
THE WITNESS: The patent or papers to that effect?
MR. BHATIA: Either one, sir.
BY MR. BHATIA:
Q Dr. Farone, have you actually read these
papers, or have you only seen -- I can see from here

that
you're looking at a list of citations.
A Correct.
Q What I'm really interested in, sir, is
who

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are the people at Philip Morris while you were there
who
were most knowledgeable about the addition of
antioxidants
to filler?
A Well, if that's a different -- I
thought what
I was doing was finding references. Normally the
reason I
don't have direct access to all of these -- I think
I've
mentioned this before -- that if there's like three
or
four references on a subject, I don't do cites, but
--
Q I know your citation rule. But if you
tell
me the names, people, that's all I really want. The
reason why we asked you to find the patents was so
you
could tell us --
A Okay.
Q -- who the people were.
A Sure.
Well, it's not Philip Morris people
that are
on these patents.
Q Somebody else's patents?
A Yeah. They're outside the industry.
Like
JTS, Japan Tobacco. That paper's in the literature.

The many people at Philip Morris who would
be
most knowledgeable at the time I was there were
Dr. Charles, Dr. Pages, Dr. Osdene, and then, as I
mentioned, the people who actually made up the
cigarettes
that contain the antioxidants. But the actual

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determination of whether that was better or not was
in
Dr. Osdene's group.
Q Okay. And was there anything about the
patent the company outside of Philip Morris held
that
prevented Philip Morris from utilizing any of the
antioxidant treatment?
A Not that I'm aware. I was only using
that as
a means of saying that the use of antioxidants has
been
advocated for several decades, at least, and has
been
studied by different companies at different times
and to
the extent of even patents being applied for.

Q Do any of the ingredients that are added to cigarettes made in the United States meet the criteria of being antioxidants?
A They could.
Q So it's possible that right now antioxidants are being added to tobacco that is being used to make cigarettes?
A Generically, yes.
Q The final way you mentioned to reduce nitrosamines is through blend modification; correct?
A Correct.
Q And even with blend modification, there's still some TSNAs in mainstream smoke?
A Yes.

Q What is your expert opinion on the maximum percentage to which tobacco-specific nitrosamines in smoke can be reduced through blend modification?
A Through blend modification using only existing cultivars of the tobacco, what's available now?
Q Right, yes, what's available now, sir.
A Probably you could remove 80 percent.
Q Just through blend modification?
A Yes.
Q On what do you base that opinion?
A I base that opinion on thinking through all of the materials that are available under current modes of treatment as opposed to ones that I've hypothesized that could have both nitrates and alkaloids reduced to the level where you would get very small amounts of nitrosamines.
For example, if you used an all-bright cigarette which has been -- they have been sold commercially.
Q I'm sorry? What's wrong with the all-bright cigarette?
A Nothing. I said it has been sold commercially.
Q Okay. Isn't it correct that bright tobaccos when burned produce higher levels of aldehydes and PAHs

than a cigarette that's blended with burley and bright?
A PAHs, I agree.
Aldehydes, you also have to look at the sugar and how much they have added and things of that

sort. But there is a correlation between the reduction in nitrates and the increase in PAHs.

Q And it's also the case that the all-bright cigarettes have higher levels of aldehydes than a blended cigarette, and that's a trade-off that might need to be made, meaning you might need to trade off lower levels of aldehydes with higher levels of nitrosamines in making a cigarette that's blended as opposed to all bright?

A That's not necessarily my opinion in the absence of information on how much sugar is added onto those cigarettes because you can obtain bright with very low levels of sugar. And to the extent you do not add sugars or casings to the cigarette, I think there are data which show that the aldehydes will be lower.

Q Okay. Dr. Farone, have you seen any biological activity testing of the cigarettes that contain the modified blend that will produce the maximum reduction in TSNA in smoke?

A No.

Q Dr. Farone, is it your expert opinion that a tobacco plant can be genetically engineered to eliminate

endogenous nitrosamines?

A Can't eliminate totally nitrosamines. Reduce them to a level where in combination with some of the other techniques they would no longer be the single largest cause of problem in disease-causation with smoking.

Q Focusing just on the genetic engineering issue, how would you genetically engineer tobacco to eliminate tobacco-specific nitrosamines such as NAB and NAT?

A If the tobacco produced no alkaloids at all, obviously, it won't produce the tobacco-specific nitrosamines.

Q But that doesn't quite answer my question.

The question is how would you genetically engineer it, sir?

A There's several ways I think I mentioned last time. One way is you simply select -- if I use

colchicine
or some other thing which causes mutations in tissue culture of tobacco, then I can have thousands of different individuals. I can then select those individuals for the inability to produce any alkaloid. I can grow those up. I can use those in a breeding program to see which of those cultivars result in offsprings which carry that genetic trait forward. And I would have a very low or no-alkaloid

tobacco.

The other way, you can simply remove the gene for the production of nicotine.

Q Well, focusing on removing -- well, you're talking about nicotine?

A Oh, alkaloids.

Q Okay. Alkaloids.

Can you tell me what the synthetic pathway is for anatabine?

A Not offhand without references.

Q Have you seen reference in the literature that the synthetic pathways for the minor alkaloids have not been well established?

A Well, I'm sure that if we take a reference that's old enough, that's probably the case, yes.

Q Well, I mean isn't it the case that there are more recent references that discuss the problems with identifying the synthetic pathway for the minor alkaloids such as nornicotine, anatabine and anabasine?

A There are references that discuss that, yes.

Q Okay. And if you're unable to identify the synthetic pathway for anatabine, anabasine and nornicotine, isn't it the case you will have great difficulty genetically engineering a tobacco plant to eliminate the production of those minor alkaloids?

A I wouldn't, but I wouldn't go about it exactly that way.

I think we just discussed if you use the shotgun approach of causing thousands of mutations, your probability that you end up with some offspring that have that characteristic -- it's called forced mutation -- as

opposed to knowing the pathway, picking out the gene, cutting the piece of the gene, and splicing it back together again.

Q Has anyone, to your knowledge, taken that approach for any of the minor alkaloids such as nornicotine, anatabine or anabasine?

A Well, that was the intent of one of the research programs while I was there.

Q What program, sir?

A The one with Crop Genetics International.

Q Who was working on that?

A Well, I was sort of the interface between Crop Genetics International and Philip Morris.

Peter Carlson, Dr. Peter Carlson, at Crop Genetics was the main researcher, and we were going to analyze all of the cultivars that they produced to look exactly for these types of genetic traits.

Q And just so we are clear, the types of genetic traits we're talking about is reducing

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nornicotine, anatabine and anabasine production of the tobacco plant; correct?

A Among others. That wasn't the only purpose. To look for the lowest alkaloid tobacco, to look for tobaccos which didn't depot polonium 210, which didn't uptake cadmium.

There was a series of things that you could screen for, any one of which or all of which would have been beneficial toward developing a more desirable tobacco material.

Q Who at Philip Morris worked on that project with you?

A The project was under the purview of the biochemical -- of the Biomaterial Science Division -- pardon me -- that reported to me, and at that time Dr. Jerry Whidby was the manager of that division.

Q So it would be Jerry Whidby?

A He was the manager. I'm not sure he was actually leading the project. It's been a while. But Jerry Whidby would be the person who was most knowledgeable.

Q Okay. Have you seen any POL testing of cigarettes made with low-alkaloid tobaccos?

A Yes. They're discussed in some of the

Caroline Levy and those kind of reports.

Q What did those POL studies show?
A Most of them showed that without some sort of alkaloid you don't get total satisfaction, but there were some interesting ones that showed that you might be able to use those as a base, for example, for adding back in a nicotine analogue.
Q So for the tobacco -- for the low-alkaloid tobacco to satisfy existing smokers, one would need to add some kind of nicotine or synthetic nicotine; is that right?
A Correct. The idea would be to add it in such a way that you don't get the formation -- if you had no nitrates, for example, and you added a nicotine salt that vaporized without undergoing pyrosynthesis, there's no nox present, then, in fact, the idea was that you would adjust the nicotine and not the tobacco-specific nitrosamines.
Q Which nicotine salts will vaporize without pyrosynthesis?
A None of them will vaporize totally without pyrosynthesis. We're talking about relative amounts like the citrate, maleate, levulinate, the organic acid salts. They had different rates of not pyrosynthesizing, and I don't remember them, but they were pretty high where you didn't get the pyrosynthesis.
Q What are you comparing? You're comparing

nicotine organic salts to what?
A To nicotine that's in the tobacco naturally.
Q In what form is nicotine in the tobacco naturally?
A Well, that depends on a lot of things. But let's assume that it's primarily protonated in the tobacco and it's bound so that it's -- as you -- it takes a little more energy to either vaporize it -- whether it condenses in the tar or whether it stays in the gas phase, that's another issue -- but it takes energy to remove it

from the
substrate, and the idea is to lower the amount of energy
it takes so it's not in the regime where either combustion
or pyrolysis changes it into something else.
Q Is it in a -- is nicotine in its natural
state in tobacco in a salt form?
A Doesn't have to be. Some of it is. Some is
in salts and some is free.
Q What percentage is in salts in burley and
what percentage is free in burley?
A I don't have those references with me.
Q When nicotine is in a salt form in burley
tobacco, what is the cation?
A Are you saying the nicotine is charged?
Q No. I'm asking you when nicotine is in its
natural state in tobacco, what is the cation?

A I'm confused. When it's in its natural
state, it's protonated, so it has an anion associated with
it, not a cation.
Q I understand, but there has to be a cation
for there to be an anion, doesn't there? What is the
anion?
A Well, could be the chloride. It could be
sulfate. It could be the nitrate. The protonated
nicotine is the cation. That is the positive ion.
Q That's what I was saying.
A Well, that's not what I understood.
I understood you to ask me the question if I
have it in its natural state, what is the accompanying
cation.
Q No. I was asking first to define which one
was the cation, and then we'll ask you which is the anion.
We were going to ask both. We can just ask the ion if
you'd rather.
So it's your testimony that nicotine in its
natural state is either in a nicotine nitrate, nicotine
chloride or -- what was the third one you mentioned?
A That's not my testimony, but nicotine
sulfate.
Q Nicotine sulfate.
Well, what is your testimony then?

A My testimony is that it's very complex.
You

have as many anions that it can be in as you have negative charges on the entire molecular structure of the tobacco leaf.

Q Is some of the nicotine that is naturally in tobacco bound to inorganic acids?

A Yes.

Q So some of the nicotine actually in tobacco would be in a form of nicotine maleate, for example.

A Pardon me? You're confused. Maleate is an organic acid. So the chloride, sulfate and nitrate --

Q Are inorganic acids?

A -- are inorganic. So there's some of each.

Q So there's some organic acid salts, and there's some inorganic acid salts?

A Correct.

Q And you don't recall what percentage of the nicotine is in a free form; right?

A I don't recall because -- I mean it's a calculation one can do if you know the moisture level, the pH and a bunch of other things, but it's not a specific number. It differs for every piece of tobacco. We can talk about ranges.

Q Okay.

A And for normal tobacco it's very tiny in

free base.

Q What do you mean by "very tiny"?

A I'm not talking about what comes off in the smoke.

Q I understand. We're talking about the tobacco.

A What's in the tobacco. Could be on the order of -- I'd have to look at the equilibrium constants, but if we are talking about a pH down around 4 or 5 in the biological material, it could be 10 to the minus 4.

Q So substantially less than 1 percent would be in a free form in its natural state in tobacco?

A Yes.

Q Just so we're clear, because I don't think I gave a clear question there, in tobacco there is very little nicotine in its free form; correct?

A Yes, naturally occurring varieties that we know of, yes.

Q Right. And when we say "very little," you said 10 to the minus 4. That's like one thousandth of a percent?
A No. 10 to the minus 4 -- 10 to the minus 2 is one percent. 10 to the minus 3 is a tenth of a percent. So it's a hundredth of a percent.
Q So it would be a hundredth of a percent?

A Right.
Q It's pretty small.
MR. SHUB: I'm going to object to the characterization. It's all relative.
BY MR. BHATIA:
Q Now, have you seen any studies in the published literature that show that nicotine is not a precursor for NNK formation?
A Studies in the published literature that show under any conditions not, no.
MR. BHATIA: I'd like to show you the next exhibit, 21. We'll mark it.
(The document referred to above was marked Defendant's Exhibit No. 21 for identification by the Certified Shorthand Reporter and is attached hereto.)
MR. SHUB: Did you think you were going to --
Off the record.
(Whereupon a discussion was held off the record.)
BY MR. BHATIA:
Q Can you look at this? Is this a study you've seen before?
A May have. Doesn't ring a bell.
Q Okay. And just so -- I marked it for the record. Exhibit 21 is an article on tobacco-specific nitrosamines that appeared in the European Journal of Cancer Prevention.
Take a look at page 36, if you would, bottom of the page.

A Okay.
Q Do you see the paragraph beginning "Hoffman et al."?
A Yes, I do.
Q Can you read that paragraph?
MR. SHUB: To himself?
MR. BHATIA: Yes, sir.
THE WITNESS: Okay. I've read it.
BY MR. BHATIA:
Q Okay. The sentence, "According to our results, pyrosynthesis of NNN from nicotine does not

occur
and pyrosynthesis of NNK is very unlikely," is that something you agree with or disagree with?
A I disagree -- I can't form an opinion without seeing -- they reference Fisher, et al., 1991. I'd have to see what that's all about. They're not saying as I read this that it doesn't happen. They're just saying that it's unlikely in the tests that they have run.
Q Actually, they say it's very unlikely in the tests that they've run.

A Right. And I haven't had an opportunity to determine what the test is and what they're doing.
Q Now, --
MR. SHUB: Excuse me. Do you have the document he referenced?
BY MR. BHATIA:
Q Now, on page 38, if you look at the cite to Fisher, the 1919 Fisher study, do you see that?
A Yes.
Q I take it that's not a study you've read?
A I don't remember all of the documents I've read, unfortunately.
Q So it's not a document that you recall?
A Not a document I recall as we sit here.
Q Okay. Dr. Farone, I'm a little curious. I showed you this study, Exhibit 21; right?
A Yes.
Q And you weren't willing to draw any conclusion from it; correct?
A No, I didn't say that. I didn't say that I was not willing to draw a conclusion from it. But when you have something which refers to something else, as that clearly does, you like to see how the test was performed. I mean if you're asking me to accept another expert's opinion in lieu of my own, I'm not going to do that.

Q Well, I'm just -- I mean your view on that, I guess, is a sound scientific principal; right?
A My view is that you have to base it on the information you have.
With regard to Philip Morris documents, I have what I have, because unless someone's going to let me

go back to the Philip Morris library, I don't know whether there is more or less than what's there.

With regard to this documents that you gave me, the document that you gave me here, it's very clear that there's more information that's available, so why should I give you an opinion which I might be inaccurate about without seeing the total relevant documents that are available.

Q Well, you were willing to give me an opinion today, sir -- and I think we marked it as an exhibit, Exhibit 18 -- you were willing to give me an opinion that you could develop a hypothetical safe cigarette simply on a news article by Dr. DeNoble.

A No, that's not true.

Q Well, that is true, isn't it? Isn't that what you testified to?

A No.

Q Well, Dr. DeNoble has some data that you haven't looked at; right?

A My conclusion is based on the hypothesis which stands until it's refuted that it is possible to make a nicotine analogue which does not cause cardiovascular problems. That's the hypothesis.

Now, if you have a refutation for that hypothesis, I'll change my opinion.

Q I'm just trying to wonder why you're so willing to accept a statement in a news article when you know there's clearly underlying data; but when I show you a scientific study that's appeared in a peer review journal, you're not willing to draw any conclusion from it.

A I didn't say I wasn't willing to draw any conclusion. You asked me very specifically does this document change an opinion that I may have that NNK is formed by the action of nicotine and oxides of nitrogen, and I'm saying that the data in this document, since it refers to more, is inadequate to make an evaluation of the statement that they make.

Q Right. But you're willing to draw a

conclusion from Dr. DeNoble's statement even though clearly there's other data; right?

A But my hypothesis wasn't based solely on Dr. DeNoble's data. My hypothesis is based on the premises that you can make a nicotine analogue which

doesn't have the cardiovascular consequences.

MR. BHATIA: Okay. This is an article that you provided me. We're going to mark it as Exhibit 22. It's by Klaus Brunnemann and Dietrich Hoffmann and others. It's entitled "Formation and Analysis of Tobacco-Specific N-Nitrosamines."

Let's mark that.

(The document referred to above was marked Defendant's Exhibit No. 22 for identification by the Certified Shorthand Reporter and is attached hereto.)

BY MR. BHATIA:

Q Dr. Uydess -- sorry.

Dr. Farone, this is one of the documents that you produced?

MR. HURWITZ: One and the same.

THE WITNESS: Yes.

MR. SHUB: What do you mean, it's one and the same?

MR. BHATIA: Will you to stop interrupting the deposition.

MR. SHUB: I'm just asking counselor for clarification of a comment he made.

MR. BHATIA: Save it for the jury, as you like to say.

BY MR. BHATIA:

Q This is one of the documents that you relied on for your opinions; right?

A Correct.

Q Take a look at Table 8, page 131.

According to Dr. Hoffman, a cigarette that yields 17 milligrams of tar and 1.1 milligrams of nicotine under the FTC method will have a total TSNA of 344; right?

MR. SHUB: Why don't you show him where you're looking, Counselor. It might help things out.

You took him to the page but, you know, there's a lot of numbers here.

MR. HURWITZ: He's the expert, isn't he?

MR. SHUB: I don't know if he's able to follow a certain particular graph that he's looking at.

MR. BHATIA: I mean he seems to follow most things. You don't have to hobble your own witness

with
your inability to find it.
THE WITNESS: Second line under B? Excuse me.
MR. BHATIA: Yes.
THE WITNESS: Okay.
BY MR. BHATIA:
Q You see that?
A Yeah, I see that.
Q And look at under E, the cigarette that

yields 1 milligram of tar, .1 milligram of nicotine.
A Yes, I see that.
Q See that?
Under the FTC method, it appears there's a
substantial reduction in TSNAs in cigarettes that yield 17
milligrams of tar versus 1 milligram of tar; right?
A No. I don't see the relevance of this to my
opinion, but go ahead.
Q Well, can you answer my question yes or no?
Under the FTC method do cigarettes that yield
one milligram of tar yield substantially less nitrosamines
than cigarettes that yield 17 milligrams of tar?
MR. SHUB: I'm going to object because you're
asking for his opinion or are you asking him to confirm
that that's what it says on that piece of paper?
MR. BHATIA: I'm asking for his opinion.
THE WITNESS: These --
BY MR. BHATIA:
Q Under the FTC method -- yes or no -- do you
agree or disagree with what's here?
A Well, what's here is here.
MR. SHUB: How would he know?
THE WITNESS: I'm not disagreeing.
MR. BHATIA: Object if you want to.
MR. SHUB: I'm going to object.

MR. BHATIA: Fine.
THE WITNESS: Okay. I see where it says FTC tar
17, nic 1.1, which I presume means 17 milligrams of tar
and 1.1 milligram of nicotine.
BY MR. BHATIA:
Q Well, this is a document you relied on;
right? I mean you relied on this study?
A Are you interested in why I relied on it?
Q I'm asking you a question. Did you rely on
this document?
A Yes, I did.
Q Now, a cigarette that yields 17 milligrams of
tar under the FTC method, according to Dr. Hoffman,

will
have TSNAs of 344, total TSNAs.
Do you disagree with that statement in his
study?
A Only in mainstream smoke.
Q So you agree with it in mainstream smoke?
A As delivered under the FTC method.
Q Okay. And do you also agree with the statement in Dr. Hoffman's article that cigarettes under
the FTC that yield 1 milligram of tar have TSNAs of 34 in
mainstream smoke?
A Under the FTC method by his tests, yes.
Q I think that was my question, wasn't it?

A I'm not sure. I'm just making sure --

Q Do you need the question back?
A I'm just making sure that --
Q Do you need it back?
A Sure.
MR. BHATIA: Let's read it back.
(Whereupon the question was read by the reporter as follows:
"QUESTION: Okay. And do you also agree with the statement in Dr. Hoffman's article that cigarettes under the FTC that yield 1 milligram of tar have TSNAs of 34 in mainstream smoke?")
THE WITNESS: Dr. Hoffman -- was that started off
with in Dr. Hoffman's study?
MR. BHATIA: Yes.
THE WITNESS: Yes, I agree.
BY MR. BHATIA:
Q Okay. And the difference between 344 and 34
is about a 90 percent reduction?
A Yes.
Q Okay. Now, have you ever seen a list of
ingredients that the cigarette companies provided to the
Department of Health and Human Services in 1986 that
listed the ingredients that were in tobacco, added to

tobacco?
MR. SHUB: Not all the ingredients but -- object to
that question as --
MR. BHATIA: Stop testifying.
MR. SHUB: I'm going to object as misleading.
MR. BHATIA: Fine.
THE WITNESS: Yes, I have.
BY MR. BHATIA:
Q You've seen the 1986 list?
A I believe so.
Q When did you see it?

A Probably -- in 1994 probably.
Q Okay. Is it among the documents you provided me?
A No. I don't have it. I looked for it. I don't have the '86 list.
Q How did you get it?
A I don't know how I got it.
Q Well, if it was provided to the Department of Health and Human Services originally in a confidential form and it was not released to the public until 1994 -- were you aware of that?
A Well, that's when I got it, in 1994.
Q But in '94 what was released to the public was not the list of ingredients as it existed in 1986 now,

was it?
A I don't know that. You asked me out of my best recollection whether I'd seen the list, and that's my --
Q I asked have you seen the 1986 list? You want to rethink about your answer?
A To my best knowledge, the list I saw in 1984 was --
MR. SHUB: 1994.
THE WITNESS: -- 1994 was the list of compounds that was provided in 1986.
BY MR. BHATIA:
Q Okay. Are you aware that Philip Morris and the other tobacco companies provided a list to the Department of Health and Human Services every year from 1986 forward?
A No, I'm not.
Q Okay. You weren't aware of that?
A Not every year, no.
Q Okay. If you were aware of that, if that were indeed the case, would that change your opinion that you in fact saw the 1986 list?
A I'm sorry, Counsel. I'm having a hard time following the question.
If I was aware of the fact that they provided

it every year, would I be -- would that change my opinion on whether I saw one of them specifically?
Q No. No.

A The 1986 list?
Q If you learned that the cigarette companies were providing lists every year from 1986 forward --

Okay? You with me so far?
A I'm with you.
Q -- would that change your opinion on whether the list you saw in 1994 was in fact a list of the ingredients in tobacco in 1986?
A It could if I had the total chronology of the lists that were given. I'm trying my best to give you every piece of information I have, and I understand that sometimes that's confusing, but I am trying my best.
So I saw a list in '94. I presumed it was the '86 list because that's when they first were made public. If they put one out every year, it could very well be that the 1994 list was '87 or '89.
Q So just so the jury's clear, it's been your operating assumption that the list you saw in 1984 was a list of the ingredients in cigarettes in 1986; correct?
A No, I didn't know there was more than one list.
Q I understand. Before today, before you got

this revelation, it was your operating assumption that the list of ingredients that you saw in 1994 was in fact a list of cigarette ingredients as they were used in cigarettes in 1986?
A Okay.
Q Yes?
A Yes.
Q Okay. Give me the list.
Now, is it your opinion that there were ingredients that were added to tobacco that were left off the list that you saw in 1994?
A I can't answer that without going through the list right now.
Q Here it is?
A Good.
MR. BHATIA: 23.
(The document referred to above was marked Defendant's Exhibit No. 23 for identification by the Certified Shorthand Reporter and is attached hereto.)
MR. BHATIA: Just so the record's clear, Exhibit

22 23 is a document entitled "Ingredients Added to Tobacco in
23 the Manufacture of Cigarettes by the Six Major American
24 Cigarette Companies" and it's dated April 12, 1994.
25 ///

1 BY MR. BHATIA:
2 Q And I take it, Dr. Farone, this is the
3 document that you saw?
4 A Yes.
5 Q It's a document you produced to me?
6 A Yes. But I don't know which one you were
7 talking about, so if you said that in the beginning, it
8 would have been right on the money.
9 Q Okay. So which ingredients were added to
10 cigarettes in 1994 that don't appear on this list?
11 A The magic 2 percent you informed me of at my
12 last meeting. I'm not sure what they are.
13 Q I'm not sure what you're talking about with
14 all, respect, sir. But can you tell me which
15 cigarettes -- which ingredients are, in your opinion,
16 added to tobacco by the cigarette manufacturers, if any,
17 that don't appear on this list?
18 A Yes.
19 Q Okay.
20 A Okay. Philip Morris uses cooked flavors. I
21 don't see where on this list cooked flavors appears.
22 Q So cooked flavors is one.
23 A Correct. It's a wide class of synthesized
24 chemical compounds that Philip Morris adds to cigarettes.
25 Q Okay. If all of the constituents of cooked

1 flavors are in fact on this list, would that change your
2 opinion?
3 A No, because they have been chemically
4 modified. So if you chemically modify one of the things
5 on this list, it's no longer the item that's on this list.
6 Q Okay. So cooked flavors. What else?
7 A In the references I gave you, there were
8 other compounds that were listed as having been
9 synthesized and sent to Flavor Development to be used in
10 cigarettes. And I think I looked up several of those. I
11 can try to find those things again. The guicyl esters or
12 whatever, they're not on the list, also.

Q I remember one was CR-1719; right?
A I don't have the name for that.
Q You didn't know what that was?
A No, I don't know, because I don't have all the references required to decipher the code.
Q And if you learned that CR-1719 was a compound that was only used for a few months in 1980 in one cigarette brand that was only sold in South America, would that change your opinion --
A Not on everything.
Q -- about it being left off the list?
A Sure, about 1719 that would change my opinion.

Q WS-14. That was another one that you were concerned about; right?
A Correct.
Q If you learned that WS-14 was used for three months in a product called Northwind that was test-marketed in 1980 and then was discontinued, would that change your opinion about why it was left off the list?
A WS-14, if that's the case, yes.
Q Okay. What else? What else is used in Philip Morris cigarettes or in the cigarettes of any domestic tobacco company that is not on this list that should be?
A We talked about that a little bit last time.
One of the things, coumarin, is not on list, and we know that RJR was using it.
Q Well, do you have any evidence that RJR was using it after 1986?
A No.
Q Okay. So maybe it shouldn't be on the list if it wasn't used after 1986; right?
I mean if the list is dated as of a certain date, then maybe it's not a problem that it's not there; right?
A Well, if you know there's something bad and

you're asked to give a list and you take it out so that you don't have to put it on the list, chances are is it something bad.
Q Well, do you have any evidence that happened?
A No. I'm just giving you a

hypothetical.
Q I understand. It's just another hypothetical.
My question is what evidence do you have that Reynolds had added coumarin in its cigarettes after 1986?
A I don't remember the date of the Philip Morris reference I showed you where they showed that it had coumarin, so I don't know how long they had it in.
Q So you don't know?
A Right.
Q Anything else that should be taken out? I mean anything else that should be on this list in your opinion that is not?
A Yes. There's lots of things that should be on this list that aren't.
Q Please tell me.
A Sure. All of the pyrolysis products of these compounds.
Q But --
A Because --

Q -- the list is entitled "Ingredients Added to Tobacco." Is it your testimony that pyrolysis compounds are ingredients added to tobacco?
A Isn't that what a cooked flavor is?
Q A cooked flavor is a pyrolysis compound?
A They do it in the absence of oxygen. There are pyrolysis and combustion compounds in the cooking process. They're added to tobacco. So there clearly are changes that occur to these materials.
If you take valerian or any of these -- I mean cocoa is a complex material. If you roast it and you change it, then probably it should be included in its different form.
I'm not saying that I know all of the ingredients that all of the tobacco companies use. I'm not. I'm just saying this list is not an adequate descriptor of the problems that could be related to additives in tobacco and that is -- there are things left off here.
Q Sir, that's a different question. I mean, Dr. Farone, I want to know -- I mean are you

accusing --
22 is it your opinion that the tobacco companies, when they
23 provided the list to the Department of Health and Human
24 Services, intentionally left off ingredients that the
25 Department of Health and Human Services required them to

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1 put on?
2 A I don't know anything about the transaction.
3 Q Are you accusing them of violating the law?
4 A No.
5 Q Okay. So it's just your opinion that the
6 type of disclosure that should be conducted with
7 ingredients is different or ought to be different than
8 maybe what is being required of them; right?
9 A That's one conclusion, yes.
10 Q Okay. So if the only thing that they're --
11 if the only thing that the Department of Health and Human
12 Services asked the tobacco companies to do is to give them
13 a list of the ingredients added to tobacco and that is in
14 fact what they did, you'd have no basis to quibble with
15 that, would you?
16 A Of course, I would. I can quibble with any
17 basis that I want. If we're talking about legality and
18 whether it's something I would --
19 Q I'm only talking about legality.
20 MR. SHUB: As a lawyer you're now asking him?
21 MR. BHATIA: I mean --
22 MR. SHUB: What are you asking him?
23 MR. BHATIA: Will you please be quiet. Just
24 object.
25 MR. SHUB: No. I think it's ridiculous.

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1 MR. BHATIA: "Object, vague."
2 "Object, ridiculous."
3 THE WITNESS: Can we restate the question.
4 BY MR. BHATIA:
5 Q Okay. What does the Department of Health and
6 Human Services require the tobacco companies to disclose
7 in terms of ingredients?
8 A I've never seen the order, so I don't know
9 what they require.
10 Q So since you've not seen the order and you
11 don't know what is required, I take it it follows that you

don't know of an opinion on whether the disclosure that was in fact made was adequate or not under the terms of the Department of Health and Human Services order; right?

A My opinion was based on looking at this and knowing what's there and what the effects are. That's it. I mean not knowing what the order is, I'm not an enforcement person for --

Q Can you answer my question?

A I think the answer is no, but I'm not quite sure. Did I have -- I think that's the way you wanted it answered, right?

Q I just want the truth.

A Well, could you repeat the question.

Q I don't want it answered any way. I'm not

asking you to do that. I just want the truth.

A Well, repeat the question, and I'll try my best to give you a very precise answer to the question.

Q Since you do not know what the Department of Health and Human Services required the tobacco companies to disclose, --

A Okay.

Q -- I take it you also do not know whether the ingredient list that they have in fact disclosed satisfies the terms of the Department's order; correct?

A Correct.

Q Okay. At your previous deposition you said you believed that the level of additives in tobacco ranged from 23 to 25 percent; right?

A Total weight over and above tobacco including casings, flavorants and everything, is in that range.

Q That's on a dry weight basis, sir.

A Everything reduced to a dry weight basis.

Q What do you base that on?

A I base it on several things. One is the calculations that we did on mass balance for the Philip Morris processes and various other types of publications of that type that have been put out.

Q What other publications?

A Well, there's been several.

There's one that was put out for Massachusetts, the State of Massachusetts. There's one that was put out for public -- various books. I'm trying to remember the names of the books now. But discussion of the range of weight changes that is not intrinsically tobacco. That includes flavorants, everything.

Q Now, you also -- can you give me the name of a single one of these books?

A I think the reference -- one of references is in here.

Q Okay.

A But --

Q Have at it.

A We spent -- I do not have everything. I didn't bring these, and I don't have them cross-indexed to be able to immediately find an answer to a specific question.

Q Would you like to do that tomorrow?

A Do what?

Q Find the answer to that question, what you're relying on for the basis of your testimony.

A I'm relying on my knowledge.

Q Okay. If you saw information from Philip Morris that showed that the level of additives was about a

third of what you opined, would you have any basis to disagree with that?

A Yes.

Q Okay. What would that basis be?

A Well, it's -- you've got to see what they're calling additives, and I don't know what that refers to.

What I want to know is the base weight of tobacco that they purchase, take the dry weight of that as it goes into the cigarette and then the weight of the rod, subtract that from it, and how much extra weight could we put in there.

Q When you say "the weight of the rod," you really mean the weight of the tobacco column rod?

A The filler.

Q Right?

A The filler.

Q I mean you don't mean to add the filter on, do you?

A No.
Q Okay. Have you ever seen this book called "The Design of Cigarettes" by Colin Browne published by Hoechst Celanese?
A Yes.
Q Okay. I think it's one of the books you cited in your very first paper that you submitted to the

FDA; right?
A Yes.
Q Here's a little chart on page 43. Have you ever looked at that?
A Yes.
Q And according to the Colin Browne book, it shows the weight of the casing, the flavors and the humectants at about 8 percent in the U.S. domestic cigarette; right?
A That's what it says.
Q Okay. And you disagree with that?
A Yes.
Q All right. You've never seen the Philip Morris flavor formulas; right?
A The flavor formulas? The blend sheets, not flavor formulas.
Q Right. You've never seen the flavor formulas?
A Correct.
Q Okay. You say you have seen some blend sheets for Philip Morris cigarettes?
A Yes.
Q Okay. Which ingredients in Exhibit 24 make the cigarettes more hazardous than they would be if the additives weren't used. 23. I'm sorry.

A I've given -- I went and looked up some of these, as you know, and provided a little list of what they do to you or for you, and we can go down -- most of these ingredients are not intended to be inhaled. This is a GRAS list for food additives. So I would opine that if you inhaled acetic acid, for example, the second on the list, to any significant level that it would not be a good thing. Acetoin, acetophenone --
Q Well, take the acetic acid. What do you base that opinion on?
A On the MSDS and the inhalation

information
on acetic acid.
Q Okay. But how much of it is used in a Philip
Morris cigarette?
A I don't know.
Q How much of it is used in a Reynolds cigarette?
A I don't know.
Q And you've already told me whether something
is harmful or not depends in large part on dose; right?
A No. That was, I think, an opinion that you
put into the testimony.
Q Well, all right. Your testimony will speak
for itself. I think we got you on that. Sorry.
Okay. So you're saying that, for example, a

thousandth of a percent of acetic acid makes cigarettes
more harmful than they would otherwise be if the acetic
acid weren't used? Is that your opinion?
A If it's all transferred into -- being inhaled
in your lungs. We can do -- people have done TLV
calculations on the stuff that comes through the cigarette
and shown that the numbers exceed the TLV's. But, yes, my
opinion is that no safe level of acetic acid has been
defined for inhalation that I'm aware of.
Q Now, is acetic acid an antioxidant.
A No.
Q Is Vitamin C an antioxidant?
A Yes.
Q Is it meant to be inhaled?
A Not meant to be inhaled. I'm suggesting that
it be studied and an I.N.D., investigational new drug,
application be applied for, so it would be considered safe
to be inhaled.
Q But you recommended that we add Vitamin C --
A I recommend --
Q -- to reduce the production of nitrosamines;
right?
A Absolutely.
And I also recommend that this go through the
FDA, that it be studied, and that it be given approval to

use it.
Q Are you aware that a safety assessment

has
been conducted of the ingredients that are added to tobacco?
A Whose safety assessment?
Q A safety assessment by six toxicologists.
A Yes.
Q John Doull, John Frawley, F-r-a-w-l-e-y, --
William George, --
A I'm aware of the test.
Q -- Ted Loomis, Robert A. Squire, Stephen L.
Taylor.
Are you aware of that?
A Yes.
Q You disagree with it?
A Yes.
Q Okay. Are you aware that the British government publishes a list of approved cigarette additives called the Hunter list?
A Yes.
Q And that that list also includes both the
type of ingredient and the amount of the ingredient that
can be used in cigarettes?
A Not in the U.S.
Q I think we're talking about the Hunter list,

sir.
A Yes, but isn't that true that those are for
cigarettes that are sold and made in the United Kingdom.
Q I asked you are you aware that it includes
both the type of ingredient and amount of ingredient that
can be used? Yes or no.
MR. SHUB: I'm going to object as vague because
you're not specifying where, Counselor, it can be used.
THE WITNESS: No.
MR. SHUB: On that basis I object to the question.
BY MR. BHATIA:
Q No, you're not? Okay.
So I take it by your testimony then that
you're unaware that the British government publishes a
list that sets forth the types of cigarette additives and
the level that can be used in British cigarettes?
A That's a different question.
Q Okay. Answer that question.
A I am aware of that list.
Q And are you also aware that it sets forth the
amounts that can be used?

A Yes, I am.
Q Okay. And I take it that there are things that the British government has approved for use in cigarettes that you think should not be approved for use

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in cigarettes?
A Correct.
Q What?
A Cocoa.
Q Okay. Anything else?
A Licorice.
Q Anything else.
A Pyridine.
Q Anything else?
A I have to have the whole list, but we can go down the list and I can precisely point out why I have objections to each one of them, which I tried to do in that little write-up I gave you.
Q Well, start with this list before you, Exhibit 23, and tell me which ones you'd take out. We've got cocoa, licorice, pyridine.
A Okay. We started down the list, and what I was saying is that to my knowledge no approval has been granted for these compounds for inhalation toxicology in humans. Take them all out.
Q If all of the ingredients on Exhibit 23 are in fact on the Hunter list and are approved for use in Great Britain, would that change your opinion that none of these ingredients have been approved for use in inhalation studies?

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A I already said no.
Q Well, what I'm trying to get at is would it change your opinion about taking all these ingredients out if you learned that the ingredients that are used in American cigarettes domestically are the same ingredients that are approved for use in Great Britain? Just would that change your opinion?
A I said no. I already know that.
Q So it wouldn't change your opinion?
A That's correct.
Q You would disagree with the British government?
A That's correct.
Q Okay. Reynolds just came out with a cigarette that has no additives. Were you aware of that?

A I saw the advertising.
Q What did you think of it?
A I haven't -- don't know any more about it.
Called "Naked" something, "Go Naked" or something.
MR. BHATIA: Let's mark as Exhibit 24 and 25 --
let's get them marked. 24 and 25.
(The documents referred to above were marked Defendant's Exhibits No. 24 and 25 for identification by the Certified Shorthand Reporter and are attached hereto.)

BY MR. BHATIA:
Q Exhibit 24 is an article that appeared in the Wall Street Journal on August 25, 1997, entitled "The Health Groups Challenge Winston Ad Claims."
Exhibit 25 is an article in the Washington Post entitled "New Winston, New Ads, New Complaints."
Have you seen those articles before?
A No, I haven't.
Q Okay. If you look at the ad in the Wall Street Journal, which is Exhibit 24, do you see that the first thing the ad does is that it shows that the level of additives in the cigarette is 6 percent. Do you see that?
A I see that.
Q Okay. The next thing it says is that the new Winstons have just a hundred percent tobacco. See that?
A Yes, I see that.
Q Okay. If in fact this is what Reynolds has done, they've taken out the additives, I take it you would say that would be a safer cigarette because you recommend talking all the additives out?
A As a starting point and then putting back in the ones which are not harmful.
Q So you think Reynolds did a good thing?
A That's a step in the right direction.
Q And it's on the market right now?

A Okay.
Q Now, the health groups don't like it, do they?
A That's their prerogative.
Q So --
MR. SHUB: Are you asking -- I'm going to object to that question.
MR. BHATIA: Just object all you want.

Object.
Have at it.
BY MR. BHATIA:
Q You know Michael Pertschuk, P-e-r-t-s-c-h-u-k?
A Nope.
Q He was the former commissioner of the Federal Trade Commission. Does that ring a bell?
A I probably have seen the name, but --
Q Okay. Michael Pertschuk says that the Winston ad creates an implicit health claim.
Do you see that?
A Well, that's probably -- yes. I don't see where exactly that is. Which article is it in, 24 or 25?
Q 24.
A Okay.
Q Do you agree that the ad creates an implicit health claim?

A I can see where it could be interpreted that way.
Q And you know that what the health groups are doing is they're basically trying to block Reynolds from putting this cigarette on the market?
A That's fine.
MR. BHATIA: Okay.
MR. SHUB: You're wasting his time.
I don't want you to be heard to complain that you didn't have time.
MR. BHATIA: We can just add up all the time you're objecting, and if I get that additional, I would probably be happy.
BY MR. BHATIA:
Q Exhibit 25, that is the one entitled "New Winston, New Ads, New Complaints." See that?
A I do.
Q Do you know who Matthew Myers is?
A Matthew Myers?
I see here who he is, so now I do.
Q Who is he?
A According to this, he is of the National Center for Tobacco-Free Kids.
Q Okay. And have you ever met him before?
A No.

Q Okay. Take a look at the last paragraph in this article. See that? It says, quote:
"Years ago RJR recognized that the number one killer isn't the additives -- it's the

tobacco itself," he said. "If anything, the campaign ought to be, 'All of the cancer and none of the taste.'"

Now, I take it you disagree with his opinion because you think the additives ought to be taken out, and it does make a difference?

A I'm not an anti-tobacco activist. I disagree with his conclusion and I disagree with his premise.

Q Okay. Great.

Do you know what American Spirit cigarettes are.

A Actually, I believe -- is that the -- that may be the company that I mentioned that approached me at one point to do some work for them.

Q You didn't actually mention it was them.

A I'm just trying to remember. That's Arizona? New Mexico?

Q Santa Fe.

A Santa Fe. They're the ones.

Q And they have a cigarette on the market that doesn't contain additives; right?

A No, not to my understanding.

My understanding what it doesn't contain is artificial additives. They've gone out there and maybe snatched up a little peyote and some other things that -- tumbleweed or whatever. I remember talking about it.

It's got some pretty strange additives, in my opinion.

I remember this was a -- they had a little brochure or something that described the additives they put in it, and it was really kind of -- some kind of root and some kind of bark off certain trees or something kind of weird.

Q At the previous deposition you testified that you thought that the level of ingredients in Japanese cigarettes was lower than that of U.S. cigarettes. Do you remember that?

A Level of additives, you mean?

Q Correct, the level of added ingredients.

A Yeah.

Q That's still your opinion; right?

A Well, it was when I looked at the data, yes.
Q And when was that?
A Mid '80s. I don't have any data from current times about what they have done with their cigarettes in terms of additives.
I knew they used less casing and used less,

at that time, non-tobacco materials.
Q And that -- when you say mid '80s, that would have been before you left Philip Morris in '84?
A Yes.
Q What's the sales weight of tar in nicotine in Japan?
A Today I don't know.
Q What was it in 1984?
A I don't recall.
Q If you learned that Philip Morris has done studies that show Japanese cigarettes have higher additive levels than Philip Morris's cigarettes, would that change any of your opinions in this case?
A No. They have several patents on adding a lot of sugar to reduce biological activity, something that I've read about and suggested to Philip Morris they do, and they tried it in some tests, the biological activity tests, and it looked like it was equivocal but looked like it headed in the right direction. So I wouldn't be surprised that they used the technology they developed to try and make the cigarettes safer.
Q But I thought you said adding sugars increased the aldehydes and that was a great concern to you in a hundred-percent bright cigarette?
A That's correct.

Q So which is it? You either add the sugar or do you not.
A Well, we're trying to -- remember, you've got to walk this balancing act between the four classes of carcinogens. If you do that and in the basis of doing that you reduce the nitrosamines and you reduce some of the other compounds, you can come up with something that is overall less biologically active than before you

put it
in.
Q Okay. And at your last deposition you said
you weren't aware that Philip Morris was trying to reduce
the number of ingredients in its cigarettes; right?
A That's correct. I think that happened maybe
after I was here.
Q If that's what Philip Morris is in fact
trying to do today, would that change any of your
opinions?
A I would say that that's a step in the right
direction.
Q All right.
Do you have your expert report?
A Do I have it?
Q Do you have it? I think it's Exhibit 12. Is
it still in front of you?
A I don't recall it ever being in front of me.

Q Here's an extra copy.
Okay. Looking now at your expert report
dated May 22, 1997, page 1, in your report you state that
cigarette manufacturers have withheld the results of
scientific research that they have performed which relates
to the danger of smoking.
Is it your opinion that the cigarette
companies knew something about the dangers of smoking that
the scientific community did not know?
A In detail, yes.
Q What did they know that the scientific
community didn't know?
A Well, I'll give you a lot of specific
examples. But, for example, Philip Morris removed
coumarin, and I don't know that the scientific community
really realized there was coumarin in cigarettes to be
removed.
The scientific community recognize that
coumarin was a problem, but they didn't recognize that it
was necessarily there in the smoke.
I mean there's a lot of specific things like
that.
Q Well, let's start with coumarin.
On what do you base your conclusion that the
scientific community was unaware that coumarin was in

cigarette smoke?

A Well, at some point they became aware. The issue is when did they become aware. Like Philip Morris might publish it after they remove it, for example. I was just using that as an example of how any company, not just Philip Morris, can come up with information that talks to carcinogenicity or teratogenicity or biological activity, and they don't publish it, and they keep it to themselves, and if the public had known that, that could influence whether or not you would smoke.

Q Okay. Since 1964 the Surgeon General has concluded that cigarette smoking causes cancer; right?

A Correct.

Q Now, what is it that Philip Morris knew either before that time or after that time that the scientific community didn't know about the dangers of smoking?

A Well, I don't know that the scientific community knew because if they knew in 1964 or '65 probably Dietrich Hoffmann wouldn't be publishing in 1996 the details about nitrosamines, about -- a lot of the work that was done by CTR, that was kept secret. It wasn't published.

Q Well, what?

A The dangers of nitrosamines, the NNK

formation, the aldehyde work, the level of interaction of these compounds, the difficulty of balancing off the --

Q When did Philip Morris first become aware that nitrosamines were in cigarette smoke?

A I'm not sure I can pinpoint a date.

Q When did the scientific community first become aware that cigarette smoke contained nitrosamines?

A Probably around 1980.

Q 1980?

A Yeah.

Q Could be as early as 1976, though, couldn't it?

A Well, could be.

Q Would it surprise you if there was a reference to nitrosamines in the 1986 Surgeon General's report?

A No.

Q Okay. And since you don't know when

Philip
Morris became aware, for example, that nitrosamines were in cigarette smoke, how do you know they knew it before the scientific community knew it?
A They knew what they were, the levels, how to remove them, all of that. The scientific community lags what the industry knows about smoking. I mean that's just the way it is.

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Q Well, Dietrich Hoffmann seems to know a lot about nitrosamines; right?
A It was paid for by the industry. That was essentially the industry's R & D.
Q Well, the exhibit that we just marked, Exhibit 22, that was paid for by the tobacco industry?
A No. The research that was withheld in 1980 and 1981, that was paid for by CTR.
Q What research was withheld?
A I gave you a copy of Dr. Osdene's -- copy Number 3 of the Hoffmann CTR reports which talked about Dr. Hoffman's suggestions on how to reduce the effects of nitrosamines by filtration. I mean as far as I know that wasn't published.
There's a lot of Tobacco Institute documents where they agreed not to publish certain kinds of results.
Q What?
A Basically, the smoking and health results, the conclusions about nitrosamines and some of the biological activity results.
Q Which documents? Can you show me?
A Well, the --
Q I've given you the documents back. Why don't you show me what it is you think was withheld?

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A Well, are you asking in general what was withheld?
Q Yes.
A Oh. Well, there's lots of stuff that was withheld.
Q I want you to show me specific documents. I don't want just your --
A The one on top. Here's a specific document.

MR. BHATIA: Okay. Let's mark this as the next exhibit.
(The document referred to above was marked Defendant's Exhibit No. 26 for identification by the Certified Shorthand Reporter and is attached hereto.)
MR. BHATIA: Let the record reflect that plaintiffs' counsel is pointing to and handing the witness documents from a stack of document that he has gone through and --
MR. SHUB: Who's gone through them?
MR. BHATIA: Plaintiffs' counsel.
Let the record reflect that, and he is directing the witness to certain items.
MR. SHUB: I'm going to object to that characterization as completely false.
MR. BHATIA: That's fine. You have four witnesses

on this side. You can say what you want.
THE WITNESS: I provided the documents.
MR. BHATIA: I think he pulled it out of the stack, sir.
THE WITNESS: I asked him for it.
MR. BHATIA: No. You asked him for this document.
MR. SHUB: And this document.
MR. BHATIA: Yeah, right.
MR. SHUB: He did.
BY MR. BHATIA:
Q What in this document, Exhibit 26 -- can you tell me what in Exhibit 26 was not known to the scientific community?
A When I gave you this document, I outlined it and starred it. And the basic thing is, I'm pleased to report, this is Dr. Wakeham, the vice president of Research & Development, giving a presentation to the Philip Morris board of directors on October 15, 1973, in which he states:
"I am pleased to report that we already have a number of such prototypes on our shelves with more to come in the future."
And the prototypes he's referring to is a safe or safer cigarette.

Q How do you know that?
A "The definition of cigarette 'safeness' centers around a battery of bioassay tests currently with animals but eventually with humans. Our current program is to use a

limited number of such tests to evaluate filter combinations, blend components, and even non-tobacco substitute materials. We are working to be in a position to design a cigarette which will meet 'less hazardous' specifications if they are ever imposed on us and at the same time to make a product which is attractive to the smoker."

Then he states:

"I am pleased to report we already have a number of such prototypes on our shelves with more to come in the future."

Q How do you know those cigarettes were ever marketed?

A I went to work for them three years thereafter. And if in fact four different cigarettes which were claimed to satisfy the stuff within these battery of tests were put on the market, would they withhold that information from everybody who works within the company?

Q That was your earlier testimony, that you thought a lot of stuff was withheld from you. How do you know you just didn't know about it? I'm just asking.

A Okay. Because in talking with them, we were hired in '76 to do essentially the same thing.

Q Well, how do you know they didn't come on the market between '73 and '76?

A I don't know what cigarettes he's referring to. You asked me for evidence that information was withheld. This is evidence it was withheld.

Q Okay. But how do you know -- you don't know what cigarettes are being referred to; right? You've already testified to that.

A I'm getting confused.

MR. SHUB: Object. Argumentative.

THE WITNESS: Was this being published?

MR. SHUB: Typically argumentative.

THE WITNESS: Did Philip Morris publish that they have had four prototypes that satisfied the --

BY MR. BHATIA:

Q How do you know the cigarettes were not introduced into the marketplace?

MR. SHUB: Object. Argumentative.

MR. BHATIA: That's the question.

THE WITNESS: I have never seen any results that would indicate that such cigarettes were introduced in the marketplace.

MR. BHATIA: Okay.
THE WITNESS: So I don't know that they weren't.
BY MR. BHATIA:
Q You don't know that they weren't?
A Right.
Q Okay. That document, Exhibit 25 -- 26?
A 26.
Q That was one of the documents that was sent to you by plaintiffs' counsel?
A No.
Q How did you get it?
A Plaintiffs' counsel in which suit? I mean I -- not this plaintiffs' counsel.
Q That document was sent to you by plaintiffs' counsel --
A Mississippi.
Q -- who filed suit in the tobacco litigation?
A I believe it was Mississippi.
Q So you didn't get it on your own. Some plaintiffs' lawyer picked it out and sent it to you. Right?
A That's correct.
Q In your report you say that many advanced

programs -- we're back to your expert report -- many advanced programs related to smoking and health were curtailed, stopped, and never used for producing safer cigarettes.
A Correct.
Q Other than what we have discussed in this deposition -- well, actually, strike that.
Can you tell me every such program that was stopped at Philip Morris?
A With enough time.
Currently the ones I can think of are the filtration program, the --
Q Which filtration program?
A Carbon monoxide filtration program.
The reduction in nitrate we talked about.
Q Which reduction in nitrate?
A Either the naturally occurring denitrification or the microbial reduction.
Q Okay.
A The ones referred to in Exhibit 16.
The genetic modifications of tobacco which there were at least two such programs.
Q Uh-huh.
A The -- let's see.
The nitrosamine reduction program, which we

discussed.
The filter programs.
What I'm referring to there is this whole discussion that I started with my presentation to FDA where I said it was a good thing to change the nicotine-to-tar ratio, and Philip Morris comes back and said, "We never did it," and my take on that was, "This was a good thing to do and sure we did," and it was a good thing to do, and so --

Q I don't understand that at all.

A Well, in my opinion, if you look at the data, we deliberately changed the cigarette to increase the nicotine-to-tar ratio, the idea being that the tar was more harmful than the nicotine, so that's why we did it.

In the response that the industry made, primarily Philip Morris, to my FDA publication, they said, "We didn't do that. That's ridiculous. The tar and nicotine stayed the same and tracked each other."

So to me if Philip Morris is right in their refutation of my publication, then that's another program they didn't do that they should have done.

If I'm correct, then they were good guys and they did what we thought or I thought we were doing.

Q I guess I understand that.

What else?

A There was a program that seemed to be leading to pretty good results with the addition of things in along with the filler, metal oxides, platinum, things of that type, that would in fact reduce the formation of some of the biologically active components changing the combustion pyrolysis profiles.

Q Anything else?

A We talked about the extraction, the ART process.

Q Well, that product was actually introduced in the marketplace?

A And then removed.

Q But it was introduced in the marketplace?

A Correct. I think that's primarily it.

Q I mean you can't say that the ART process was never used for producing safer products, can you,

because
in fact it was used?
A No. I'm not saying -- correct, it was used.
Q So the ART process doesn't meet your definition?
A No. It wasn't withheld, just withdrawn.
Q Well, I mean you don't even use the verb "withdrawn" in the statement, "curtailed, stopped and never used," do you?
A Stopped. Yeah, sure. That's a program that

was stopped.
Q But it was used for producing safer products?
A Yeah. Many advanced programs related to smoking and health were curtailed -- that was curtailed -- stopped -- that was stopped -- or never used.
Q Well, it doesn't say "or." It says "and."
A Okay. "And" never used.
Q It's not in the disjunctive, is it? It's in the conjunctive.
A There's also a period after "curtailed." That's a mistake. But be that as it may, the idea is -- if you're asking my opinion, it would have been a good thing to keep that product on the market.
Q Okay. You also say -- well, let me ask you this:
What do you know about the research programs that were being done at the other tobacco companies which they curtailed, stopped, and never used?
A A lot.
Q Like what?
A Well, in the Mississippi, Texas, and Florida cases, I have reviewed documents of the other companies, also.
For this action I haven't gone back and reviewed a lot of those because they had protective orders

associated with them.
Q Well, do you plan to rely on any of those documents for the opinions you give in this case?
A I'm trying to find out whether the protective order allows me to do that or not.

Q Well, if you decide to rely on those documents, will we be given copies of them?
A If I decide to rely on them, I will give them to counsel who, I'm sure, will make you aware of them.
Q Okay. And it's kind of hard for me to question you about some documents you haven't seen, isn't it -- I mean that I haven't seen?
A Correct.
MR. BHATIA: So, Jonathan, why don't you give me some guidance here. Should I ask him -- is he going to offer any opinions at trial on research programs that were stopped at other tobacco companies other than Philip Morris?
MR. SHUB: I believe so.
MR. BHATIA: When am I going to get those documents?
MR. SHUB: We'll endeavor to get you those documents.
MR. BHATIA: Are you going to give me some more time with him?

MR. SHUB: I'm not going to make a commitment to that at this point.
MR. BHATIA: You agree you haven't given me those documents thus far, though?
MR. SHUB: That's correct, since it's our position you've had an ample opportunity to question the doctor.
MR. BHATIA: Hey, you know, take whatever position you want. It's a free country.
I'm not going to ask you about those because I don't have the documents.
THE WITNESS: I'd like to point out that neither does he yet, so --
MR. BHATIA: Oh, I understand.
THE WITNESS: Okay.
BY MR. BHATIA:
Q On page 4 of your declaration you also state that research -- "As this research began..." --
Do you have something to say to the witness?
MR. SHUB: Nothing. It was a schedule point, if indeed we need to do it, but that can wait.
BY MR. BHATIA:
Q On page 4 of your report you also say: "As this research began to provide further evidence for disease causation and addiction, much of it was stopped or moved

to foreign shores, where it could be effectively hidden."

A Correct.

MR. SHUB: What paragraph are you on, Counselor?

MR. HURWITZ: Entitled "Hidden Research" at the bottom.

MR. SHUB: I've got it.

MR. BHATIA: You got it?

BY MR. BHATIA:

Q Can you tell me every such program that was stopped at Philip Morris?

A Probably don't know them all. I know that a lot of the work was done, like Dr. Gullotta's stuff going over to --

MR. SHUB: G-u-l-l-o-t-t-a.

BY MR. BHATIA:

Q Okay.

A -- INBIFO, more of the projects like Tasso and Poldi and things like that being done at FTR rather than at Philip Morris.

A lot of the discussion we had earlier about the Hunter Commission data, that was all done in Europe, and very little of the testing or the information was circulated within the United States for the benefit of scientists in the United States at Philip Morris.

Q How do you know that?

A Because I was one of them when that was going on, and I didn't find out anything about it.

Q That doesn't -- it's a non sequitur.

A No. We were doing work on trying to reduce the risks of smoking in cigarettes, make a safer cigarette. Research is being done by Philip Morris paid for by Philip Morris that relates to the work that we're doing within Philip Morris and we're not aware of the results of the research that Philip Morris is paying for or is involved in in Europe. So it does, in my opinion, support this.

Q How did the research -- how was it hidden? Hidden from whom?

A Hidden from both people inside and outside the company who might have a reason to be actively

17 interested in that for the benefit of smokers in general.
18 Q Well, how was it hidden from people outside
19 the company? How was moving it overseas --
20 A How was it hidden?
21 Q No. How was moving it overseas -- strike all
22 that.
23 MR. SHUB: Counselor, could we take a five-minute
24 break?
25 MR. BHATIA: No.

1 BY MR. BHATIA:
2 Q How was moving research overseas a way to
3 effectively hide research?
4 THE WITNESS: Excuse me. May I at least get a
5 drink?
6 MR. SHUB: We're going to take a five-minute break.
7 I thought I was being courteous to ask, but now there's
8 not going to be any asking.
9 THE WITNESS: I need to get a drink.
10 MR. BHATIA: Sure. Of course.
11 (Recess)
12 MR. BHATIA: Would you read the pending question.
13 (Whereupon the pending question was
14 read by the reporter.)
15 THE WITNESS: The scientists, scientific
16 community, and people working on it in the United States
17 have less access to it if it's in Europe somewhere,
18 especially if we're not given copies of the reports or
19 anything of that type.
20 BY MR. BHATIA:
21 Q If research was hidden from you, how did you
22 come to learn about it?
23 A Only through the documents that I've been
24 provided as part of these various plaintiffs' actions.
25 Q Documents that were produced to plaintiffs'

1 counsel; right?
2 A Correct.
3 Q So the documents weren't hidden from
4 plaintiffs' counsel, were they? They were produced to
5 them; right?
6 A Yes.
7 Q Okay. And according to your testimony for
8 the last day, you saw quite a bit of biological activity
9 testing at Philip Morris, didn't you?

A, Oh, the stuff that was done within the R & D center, yes.
Q Was it also the case that many reports were circulated at Philip Morris that contained findings from INBIFO and you received copies of those reports?
A Not very many. I can think of maybe one or two in my tenure there where I was actually on the distribution list of such a report.
Q Okay. Which one or two can you think of?
A Offhand, I was not on the distribution list for INBIFO reports.
Q I thought you testified that you didn't know about INBIFO until after you left the company?
A I didn't know Phil Morris owned INBIFO. I didn't know that Tom Osdene -- the guy reported to him and was making a hundred and fifty thousand a year, whatever

it was. I learned about that through the T.I. letters and memos.
Q Okay. So you did see INBIFO reports; you just didn't know that Philip Morris owned it?
A Correct.
MR. SHUB: I'm going to object to that characterization of his testimony.
THE WITNESS: I didn't know -- like the inhalation studies, I mean the reports that we saw were -- that I saw, was probably -- I can't even think of one where I was on the distribution list. Tom may have shown me stuff from time to time, but the bulk of that work was not shared within the R & D community at Philip Morris, and that trend continues up through '89.
BY MR. BHATIA:
Q Can you give me any more specificity on the research that was moved overseas to hide it other than identifying Gullotta's work and some of the Poldi and Tasso work?
A Yes. The inhalation -- as far as I know at R & D in Richmond, no inhalation toxicology was done. No skin painting was done. None of the in vivo type testing other than Dr. DeNoble's work, which was closed

down,
24 which constitutes a form of stopping or hiding, that was
25 all done at the laboratories in -- either at INBIFO or --

1 I also understood we were using contract laboratories. I
2 didn't know who they were, but I had done work like that
3 at Lever Brothers. So, you know, Hazelton or Wyeth or
4 whoever's laboratory we might use.
5 Q If Philip Morris -- so it's your testimony
6 that Philip Morris was using contract laboratories in the
7 United States for biological research; right?
8 A That's correct.
9 Q And if those laboratories required as a
10 condition of doing the work that they be permitted to
11 publish the findings of their research, would that change
12 your opinion on ways in which research could be hidden?
13 A Well, not generally because if you're a
14 subcontractor -- the contracts I'm talking about, Philip
15 Morris owns the results of that research if they're paying
16 for it. I'm not talking about university or CTR work.
17 I'm talking about Hazelton or Wyeth or INBIFO that I
18 thought was another private company.
19 Q I'm asking are you aware of any instances in
20 which contract laboratories require as a condition of
21 doing work for Philip Morris that they be permitted to
22 publish the results?
23 A The Abood work, some of that work, I was
24 aware of that, yes.
25 Q Is there any other work that you're aware of?

1 A Probably. I mean some of the university
2 studies that were done -- I think some of the M.C.V.,
3 Medical College of Virginia, work, also had a stipulation
4 like that, but I didn't see the contract, so I'm not in a
5 great position to give you information.
6 Q Any other research that you believe was moved
7 to foreign shores so that it could be effectively hidden?
8 A I think we've covered the basics.
9 Q Are you going to testify about any

research
programs that any other tobacco companies other than Philip Morris moved overseas?
A I'm trying to remember all of the things I've seen. I don't think -- B.A.T. is a special case because a lot of their stuff was done overseas because they own B & W, so it's not moving it overseas to hide it. It's simply using the existing system that's set up to shield it from B & W.
Q Are you going to testify about B.A.T. research at trial?
A I haven't -- I mean if the documents are available and if I'm asked, if I review them, I could. But so far I haven't done that.
Q Have those documents, those B.A.T. documents, been made available to us in this case?
A No. They haven't even been available to

plaintiffs' counsel in this action. And I haven't reviewed them since I became involved in this action. This was all reviewed for Mississippi and Texas and Florida.
Q So as it stands today, you don't intend to offer any opinions in this case on research that was a conducted by B.A.T. overseas?
A Overseas, that's correct.
Q Okay. Page 5 of your report at the top you say:
"During the course of this research many potential product concepts were discovered that could have been used to reduce the risk associated with smoking."
Do you see that?
A Yes, I do.
Q And you use the words "this research." Do you see that?
A Yes.
Q Are you intending to refer to the research that was moved to foreign shores where it could effectively be hidden?
A No. It wasn't limited to that.
Q I mean that's the way it reads if you just read it. I mean it's under the heading "Hidden Research";

right?
A Yeah, but if you go back to the first

sentence in the previous paragraph, we're talking about,

"The tobacco products companies have gone to great lengths to conduct hundreds of millions of dollars of research on the relationship between smoking and health and on the effects of nicotine."

This document wasn't proofread by, you know, good writers. I did this all on my own, and so it's got all the warts of having maybe improper reference back to the previous part of something else.

Q I thought you testified that there was an earlier draft of this that you provided to your colleague at Applied Power Concepts and he read it to avoid those kinds of problems.

A That's correct.

Q So it was proofread?

A Well, but not to the extent that a good editor would in a journal. They'd pick up something like that and say, "What does 'this' refer to?"

Q Now, the potential product concepts that were discovered that could have been used to reduce the risks associated with smoking, are those anything other than the ones you've already described in your deposition?

A No. They are the ones that we talked about earlier.

Q So there's nothing new out there?

A Not that I'm aware of right now.

Q Okay. Excellent.

Now, it's your belief that Philip Morris set up a program to screen tobacco for polonium 210; is that right?

A To screen tobacco for radioactive activity, not limited to polonium 210, yes.

Q When was that program set up?

A It was active '83 or '84. Again, it's one of those ones that I wasn't privy to, so I don't know the exact dates. I just know that they built the so-called low-level laboratory. They staffed it, and they ran samples through it.

Q Okay. And I believe you refer to some testimony by Dr. Ellis where she said that there was no program at Philip Morris to screen for polonium 210.

I take it then that you believe one of

the
things this low-level facility was testing for was polonium 210?
A That was the impetus for setting up the low-level laboratory.
Q Okay. Would it surprise you if you learned

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that the impetus for setting up the laboratory was the incident at Chernoble in Europe?
A I don't think that -- I mean --
Q The answer is yes or no?
A The answer is yes. It would be extremely surprising if that were the sole reason why they set up that laboratory.
Q I don't think that was the question. The question was impetus.
A The -- okay.
Q But can you answer my question?
A Yes, that would surprise me.
Q Yes, that would surprise you?
Now, on page 5 of your report, the paragraph beginning, "The industry had published..." do you see that?
A Yes.
Q Now, you see where they say -- where you say, quote:
"They attempted to decrease the levels of nitrates because they know that while increasing nitrates reduces PAHs, it generally increases the delivery of the oxides of nitrogen and nitrosamines."
A Correct.

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Q And who is the "they" you're referring to?
A The industry.
Q And I take it in the case of Philip Morris, one of the ways in which Philip Morris attempted to decrease the level of nitrates was the implementation of the denitrification system at Park 500 where reconstituted leaf is made; right?
A Correct.
Q Okay. And what did the other companies do that you're aware of to decrease the levels of nitrates?
A They tried to get low-nitrate tobaccos, some of them. Some of them also looked at microbial reduction technology. There was stem washing programs at some companies that used stems, per se. They would just

wash
it and throw the nitrates away.
Those are the three things that I'm aware
of.
Q You see the paragraph that begins, "The tobacco products industry is faced with many choices"?
A Yes.
Q Are you aware of current programs at Philip
Morris to attempt to modify the way in which tobacco is
burned and pyrolyzed so that there's a substantial reduction in nitrosamines, PAHs, and other harmful constituents of tobacco smoke?

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A No, I'm not.
Q If Philip Morris was in fact working on programs like that, would you consider that to be a step
in the right direction?
A Yes, I would.
Q And if the cigarette that Philip Morris was
working on also provided a controlled burn so that it
eliminated any risk of a cigarette-related fire, would you
consider that to be a step in the right direction?
A Yes, I would.
Q And if the cigarette that Philip Morris was
working on controlled the burn of the cigarette so that
there was little or no sidestream smoke, would you consider that to be a good thing?
A Actual -- not just visible reduction of something we can't see but -- you mean actual mass percent
of material delivered?
Q Absolutely.
A Right, then I agree.
Q I mean essentially a cigarette that would
only burn when it was being puffed on and then only in a
controlled manner so that nitrosamines and PAHs and other
harmful constituents were generated at substantially lower
levels.
A In the sidestream?

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Q In the sidestream and in the mainstream.
A Yes. That's great.
Q You would applaud all of those efforts?
A Correct.
Q And in the documents that the plaintiffs have
provided you, you've not seen any references to that effort by Philip Morris; is that right?

A Well, I have seen very few current documents. I mean I think I have one document from 1997, and everything else probably is from '89 or '90 going back.

Q Okay.

A So the last seven years.

Q I mean if there's a big program that Philip Morris has been pouring tens of millions of dollars into from 1989 forward, it's your testimony that you didn't -- you weren't aware of that program because the plaintiffs' counsel didn't select and provide you those documents; right?

MR. SHUB: I'm going to object to that characterization because that assumes --

MR. BHATIA: Object.

MR. SHUB: -- plaintiffs' counsel has the documents.

MR. BHATIA: Oh, will you stop testifying. Your

objection is noted.

BY MR. BHATIA:

Q Can you answer the question?

A I don't have any such documents, so yeah.

Q Right. That's fine.

And the reason you don't have those documents is they're not among those that were selected and provided you by the plaintiffs' counsel?

A Collectively plaintiffs' counsel, yes.

Q I mean in all the litigations against the tobacco industry, they're just not things you were provided?

A Right.

Q Now, at the bottom of page 5 you refer to, quote:

"The industry had technology available to reduce these gases and failed to use it."

And the "these gases" are carbon monoxide and the oxides of nitrogen; correct?

A Correct.

Q And I take it that the technology that you're referring to is the cobalt/aluminum filter?

A Well, there's several ways to reduce CO, carbon monoxide, but the oxides of nitrogen I'm referring to is the denitrification extensions that we've already

talked about.
Q Okay. Does the reference at the bottom of
page 5 that I just read include any filtration work?
A Yes, it does.
Q And in terms of filtration work, is that the
cobalt-and-aluminum filter?
A That's one of the ones. That's the primary
one. There was also -- that's the one that I know worked,
so, yes, for carbon monoxide. But that didn't at the time
do very much for reducing oxides of nitrogen.
The whole impetus behind increasing the
nitrate removal were the oxide of nitrogen numbers that
might be forced to be put on packs that you would have to
disclose how much n-o-x you had in your smoke, and so it
sort of was, "Well, if they force us to do it, we'll
implement this technology so we'll have lower numbers. But
unless we're forced to do it, we're not going to implement
the technology just to reduce the oxides of nitrogen."
Q And where was it that the companies would be
required to place nitrous oxides levels on the pack?
A Well, there was concern about Germany,
Canada, even in the U.S., that FTC might come out and say,
"Okay. We're going to go ahead and do what Germany has
done and require that gases be put on the pack."
Q In Germany it's not that the gas -- I mean is

it your testimony that in Germany, cigarettes sold in
Germany, that the nitrous oxide level is on the pack?
A No. They have to provide a list of the
deliveries.
Q Have you heard of something called the
Hirschfeld index?
A Yes.
Q Okay. Isn't it the case that when the
Hirschfeld Index was being developed in the mid '70s
Philip Morris responded by instituting a denitrification
system at Park 500 so the nitrous oxide levels of
cigarettes would be reduced?
A Yes, but only to an extent.
Q In the aluminum/cobalt filter that you've
talked about, who was the person at Philip Morris most
knowledgeable about the work that was done on that
filter?

A I would -- I don't know who's there now. At the time?
Q Uh-huh.
A Dr. Allen Kassman was the manager of the Physical Research Division in which most of that work was done, and the scientist who worked on it was Dr. William Dwyer.
Q Dr. Kassman was a friend of yours; right?
A Yes.

Q Still is?
A I don't know.
Q You consider him to be a fine scientist, don't you?
A Yeah. He was one of the brighter people who worked for me. I had a lot of respect for Dr. Kassman and still do.
Q What about Bill Dwyer, what do you think of him as a scientist?
A Bill was good. I haven't seen or heard from him since '84, so I don't know if he's even still there.
Q If it was Dr. Kassman and Dr. Dwyer's opinion that the aluminum oxide and cobalt catalyst didn't have a very long lifetime, would you dispute that?
A Well, that's contrary to the results they presented to the Richmond meeting, so what that means is it didn't have a long lifetime and then we made it so that it did have a long lifetime, and since we told the management of the company that it had a long lifetime, it's now lost its long lifetime again, so I would dispute that.
Q You would dispute it. Now, if they testified that one of the problems with using an aluminum oxide and cobalt catalyst is that there was no way to deal with the heat that was generated from the oxidation of CO to CO2,

is that something you would dispute as well?
A My recollection is we have data which showed you could smoke as many as 20 cigarettes through a

single
filter and reduce the carbon monoxide by up to 98 percent
even on the last few, so I would refute that.
Q What about testimony that said that during
the oxidation process 80 to 90 kilocalories per mole were
generated from the catalysis process and that made the
filter tip unuseable, would you dispute that?
A I believe we addressed that issue in the
design of the filter tip. I mean what they may have -- we
actually had working prototypes that didn't burn fire,
that didn't get hot, that didn't -- it may change the kind
of tip you have to use.
One of the devices that we were discussing
which I believe was presented by Mr. McDowell to the board
was a cigarette holder that might have been ceramic that
you can smoke up to 20 cigarettes and would be sold with
the pack. So this would be a filter in addition to the
filter that you already have on the cigarette. You'd put
the cigarette into this holder. And that device
seemed to be perfectly okay for smoking a cigarette. I
mean I think it was demonstrated in the Richmond meeting,
somebody smoking.
Q So you would dispute it then?

A I would, uh-huh.
Q Okay. Are you aware that after you left
Philip Morris, in the 1980s -- in the late 1980s and early
1990s that Philip Morris revisited the catalysis project
with outside scientists from Seton Hall?
A No.
Q And if you were presented with data that the
outside scientists in Seton Hall came to the conclusion
that the aluminum oxide and cobalt catalyst didn't work,
would you dispute that as well?
A Yes.
Q Okay. And I take it you've not seen any data
from the work that Philip Morris has done at Seton Hall on
the catalysis project?
A No, I haven't.

Q Okay, Dr. Farone. Still back to your report.
MR. SHUB: Off the record a minute.
(Whereupon a discussion was held off the record.)
MR. SHUB: Back on.
MR. BHATIA: Back on.
///
BY MR. BHATIA:
Q Look at the section marked "Additives."

MR. SHUB: What page?
MR. BHATIA: Page 7.
MR. SHUB: He did say "please," Dr. Farone. We just didn't hear it.
BY MR. BHATIA:
Q The paragraph beginning "U.S. cigarettes differ in another way from foreign cigarettes."
A Yes.
Q If you learned that Japanese cigarettes contained a higher level of additives than U.S. cigarettes, would that change the opinions set forth in the first two sentences of your expert report under the paragraph "Additives"?
A Well, I wasn't limiting this to Japanese. I mean Canada now doesn't have additives. I think Germany has a restricted number of additives. I think because of the Hunter list there's fewer additives used. I'm not sure it would change the substance of the problem that I see with the effect of additives being different, use of the word "additive" to the problems associated with tar.
Q But if you learned that Philip Morris was removing the number of additives that it used in the cigarette manufacturing process, would that change any of the opinions that you set forth in those first two sentences?

A Yes. I indicated before that I would applaud that action.
Q Okay. Now, you say that -- the sentence beginning "Many of the active ingredients and materials in this list are known to have central nervous system effects similar to nicotine and some are hallucinogenic," can you tell me which of the ingredients that are added to tobacco

are hallucinogenic?
A Yeah. I gave you a paper that I wrote on that subject.
Q Can we find it?
A I hope so.
MR. SHUB: He'll find it, Dr. Farone.
MR. BHATIA: I don't think I --
THE WITNESS: Oh, yes. It was very definite. It was in my FDA file.
MR. BHATIA: Was it one of the ones we marked last time?
THE WITNESS: I don't know whether it was marked.
MR. BHATIA: Was it Exhibit 5-E?
THE WITNESS: Could I see it.
MR. BHATIA: Can you show him the original of 5-E.
THE WITNESS: That's it, yes. Yes.
MR. BHATIA: This is it?
THE WITNESS: This is it.

BY MR. BHATIA:
Q Okay. The first question is does whether an ingredient produces a hallucinogenic effect in cigarette smoke depend on the amount that's used?
A Very little is known about what happens when you combine some of these ingredients with each other and with nicotine.
Q So is the answer to my question no?
A No. I'd say the answer to your question in general is that, of course, effect is going to be important with hallucinogens unlike carcinogenicity, yes.
Q So you don't know the quantity of the ingredients that are added to tobacco, do you, and the levels?
A I don't think that's relevant to my testimony, but the answer is no.
Q Okay. So it's -- is it your opinion -- let's, I guess, step back for a second. Go to 5-E.

Looking at Exhibit 5-E, which of these ingredients -- show me the first one that is hallucinogenic.
A Oleoresin.
Q O-l-e-o-r-e-s-i-n?
A Yes.
Q What's that?
A Well, on the right-hand column I give you some indication of the common or general chemical that's classified with it. So those are gingerol, which is

a
specific chemical compound, and terpene which is a class
of compound.
Q Is oleoresin -- does it come from oleic acid,
o-l-e-i-c, acid?
A No.
Q What does it come from?
A Well, oleoresin can come from a variety --
oleoresin can come from wood extracts, from various
kinds. It's oil associated with growing plants. Oleate
is only a specific example derived from usually animal or
vegetable fat, so this is a more general term, oleoresin.
Q What ingredient on the ingredient list,
which is Exhibit 23, corresponds to oleoresin.
A Well, it's the -- 239.
Q Ginger oil?
A Ginger oil and oleoresin.
Q Okay. So --
A Those are -- see, that's ginger oil and
oleoresin. The computer got a little out of context
there. The word "zingiberene" is a chemical that goes
over on the right-hand side to be listed with gingerol and
terpenes, so that's a computer problem.
Q Okay. So it should be ginger oil and

oleoresin?
A Yeah, number 239 on the list.
Q Now, ginger oil, it comes from ginger; right?
A Yes.
Q And people cook with ginger; right?
A Uh-huh.
Q And it's also used in, like, baked goods and
meats; and some candies even use ginger. Right?
A Correct.
Q Okay. Now, do you have any evidence that the
amount of ginger oil and oleoresin that is used in Philip
Morris cigarettes produces a hallucinogenic effect?
A There is some evidence from the literature on
the people who do these kinds of things on, like, the
Internet that when you take these common ingredients that
you find in your kitchen and you burn them and you inhale
it that you get an effect which is far out of proportion
to what you would get from eating it.
So you can't use the levels of effect from
ingestion to tell you what's going to happen when

you
21 inhale it.
22 One of the documents that the industry has
23 provided says that these things don't pyrolize, that
24 they're transferred intact in the smoke into the lungs,
25 which would mean that you need a very small amount to give

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1 the effect.
2 But my basic premise, just so you don't get
3 the fact that I'm saying that all of these things -- when
4 you have something like nicotine or alkaloids, the general
5 principal pharmacologically is that anything you add to
6 that you should test it to make sure that it doesn't have
7 an effect.
8 So I understand you're asking me to show you
9 all the effects these things have in combination or
10 separately. All I'm saying is that the right way to do
11 that -- my testimony will be the right way to do that is
12 you start off with nicotine and then you show the
13 additives one at a time in combination and then in
14 combinations to prove that they are okay and not giving
15 you an effect.
16 Q Now, I take it then by your answer that you
17 don't have any evidence that the ginger oil and oleoresins
18 in the quantity used in cigarettes actually produces an
19 effect; is that right?
20 A I don't, correct, because I don't know the
21 levels they're used at.
22 Q All right. I've got it.
23 Now, in your report you say some of the
24 ingredients are hallucinogenic.
25 A Correct.

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1 Q And am I right that every ingredient
2 that you believe is hallucinogenic is contained in
3 Exhibit 5-E?
4 A No. I think I'm pretty -- I mean I didn't
5 have time to do all 599. What I did, if you read the
6 first part, I picked -- I started down the list, and I
7 used the references that are cited at the end of this,
8 which are some of the books I brought, and they're very
9 much stated in there, just to look through and see,

are
readily available without going to the literature and spending lots of time and money on literature searches of each one of these.

Q Is it your intention to offer opinions at trial about ingredients that are added to tobacco that are hallucinogenic that you don't identify in Exhibit 5-E?

A It's not my intention as we sit here. If somebody asked me to go through and do the rest of this, I'd have to consider whether or not I had the time and money and whatever to do that.

Q If you did that, you would generate a document and you would provide it to defense counsel; right?

A Correct.

Q But right now you haven't done that?

A Correct.

Q So as of today, every ingredient that you intend to offer an opinion on at trial that you believe is a hallucinogen is identified as such on Exhibit 5-E?

A That's true for hallucinogens, yes.

Q Okay. Now, for the hallucinogens, is it the case that for every ingredient that is identified as a hallucinogen on Exhibit 5-E that you have no evidence that the ingredient is in fact hallucinogenic in the quantities that are added to cigarettes?

A That is -- that's correct.

Q Okay. Now, you also say that a number of the ingredients are known to have central nervous systems effects similar to nicotine; right?

A Correct.

Q Are the ingredients that you believe have a central nervous system effect similar to nicotine that you intend to offer opinions on at trial identified on Exhibit 5-E?

A No, not all of them.

Q All right. What is missing?

A The pyridine/pyrazole complex that are discussed in a lot of Seeman's work as being flavor additives.

Q Pyridine is there on Exhibit 5-E.

A Correct.

Q Pyrazole is not there; right?
A Pyrazole. That's the cooked flavor stuff.
Q And how do you spell "pyrazole"?
A P-y-r-a-z-o-l-e, maybe two r's.
Q Okay. And pyrazole comes from the cooked flavors; is that right?
A That's a potential way of getting some of these compounds is to take amino acids and proteins in the presence of sugar and react them together.
Q Is pyrazole on the ingredient list, or does it correspond to some ingredient on the ingredient list?
A I don't think so, but let me check to make sure. I didn't see it here.
I don't see it here.
Q Okay. But the way pyrazole ends up in cigarette smoke is as a result of the burning or pyrolysis of the cooked flavors; is that right?
A Well, you'll make a certain amount naturally. When you burn a cigarette, you'll get some of these things off. If you find that those things are beneficial flavorants and you want to increase the effect, you could add pyrazole or you could add cooked flavors. The cooked flavors simply take, like, amino acids, protein and sugars, you cook those up, you make the pyrazole, and now you enhance the level of some of those compounds in the

smoke.
Q Okay. Is pyrazole added to Philip Morris cigarettes?
A Well, through the cooked flavors it's added. I mean we know that they're present in the cooked flavors. And, see, that's -- there's a distinction here. I don't want to get hung up on this distinction of whether you add these things directly or I take a couple of them and I cook them together and make something else and add that. To me that's not on -- if I cook two things together, that's not the same as adding the material that's here.
Q So it would be your testimony if you cook two things together and it makes the two things plus a third

thing, you should put all three things on the list?
A Correct.
Q Okay. And other than the pyrazole/pyridine complex, is there any other material that you believe has a central nervous system effect similar to nicotine that you intend to offer opinions on at trial that is not contained on Exhibit 5-E?
A I don't know. I haven't looked up -- if you look at Number 8 on the list, on the ingredient list, there is an acetylpyrazine which may have --
Q Is acetylpyrazine -- that could be the

pyrazine that we couldn't find before from the cooked flavors?
A That's pyrazole. It's related to that. It's not exactly the same. It's a related compound. There's an ethylpyrazine, also, if you look at number 6.
In other words, I haven't gone through -- as we said before, if I go through this and provide plaintiffs' counsel with any further analysis, you, of course, you know, as far as I'm concerned, can have access to all of that. I mean it's not -- it's just as of right now I don't want to limit myself because I don't know what I'm going to be asked to do. But right now what you see is what exists.
Q Just so we're clear, at trial there are no compounds that you intend presently to identify as having a central nervous system effect similar to nicotine that are not contained on Exhibit 5-E or are not part of the pyridine/pyrazole complex; correct?
A Or not contained in Exhibit Number 23.
Q Well, that's slightly different. That opens -- I mean Exhibit 23 is all the ingredients. What I'm trying to understand is as you sit here today, --
A Okay.
Q -- as you sit here right now, are there any ingredients that have a central nervous system effect similar to nicotine that you intend to offer opinions on

at trial that are not contained on Exhibit 5-E or are not part of the pyridine/pyrazole complex you identified?

A That's correct.

Q All right. You believe that there are a couple of ingredients in cigarette smoke that have brought -- that have pharmacological effects such as opening the bronchial passageways; right?

A That is a conclusion that is not restricted to my belief, but, yes.

Q Okay. So it is your opinion that there are certain ingredients that are added to tobacco that have the effect of opening the bronchial passageways?

A Correct.

Q Okay. And is one of those ingredients cocoa?

A The specific ingredient is theobromine.

Q Is theobromine added directly to cigarettes, or is it added as a chemical constituent in cocoa?

A It's part of the chemical constituent in cocoa or chocolate.

Q So the ingredient that we look at on the list was chocolate, but the active ingredient in the chocolate is the theobromine; right?

A Correct.

Q How much theobromine is prescribed by a

doctor to open the bronchial passageways?

A The literature on that is available. I haven't researched it, I mean, in a long time.

Q So you don't know the amount necessary to open the bronchial passageways as you sit here today?

A As I sit here today, that's correct.

Q And you also don't know, I take it, the amount of cocoa that Philip Morris adds to any of its cigarettes, the exact amount?

A That's correct.

Q And I take it from that that you do not know whether the amount that -- the amount of cocoa that Philip Morris uses in a cigarette does in fact have the effect of opening the bronchial passageways?

A Well, I don't know if I can go that far because there's probably two dozen people at Philip Morris that seem to think that there was enough in there to do that.

Q Well, who would those people be? You

said
two dozen.
A Okay. The people whose names are on that
list.
Q Okay. Including yourself?
A I was the author. I didn't come up with the
ideas.

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MR. BHATIA: Okay. Can you show me where --
Let's mark this document.
(The document referred to above was marked Defendant's Exhibit No. 27 for identification by the Certified Shorthand Reporter and is attached hereto.)
BY MR. BHATIA:
Q Can you show me in Exhibit 27 there is a
reference to theobromine?
A On page 2, item 2, it says:
"It was also pointed out that some additives that could be useful might come close to this."
"This" being delivering therapeutic agents
via smoke.
"For example, anethol, caffeine, eugenol, vanilla and theobromine were mentioned. Additives could function as bronchial dilators, appetite suppressants, et cetera."
Q Now, it's sounds like from that document
somebody was considering adding theobromine directly to
cigarettes. Was that the idea that was being
discussed?
A No. We, the people that are here, are primarily chemists. We know it's present in chocolate.

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The question before the house is should you increase the
levels of chocolate; should we add chocolate to
everything.
Q Well, there's nothing in paragraph 2 that
refers to chocolate. It refers to theobromine directly.
A I recognize that. I'm a scribe at that
meeting.
Q You took these notes?
A I took these notes, but I'm not participating
in the meeting. I was a director. I'm the coordinator.
This was an idea session, and we thought it would be neat
for a director to stand up and take the notes. So these
are the ideas of the people who are on the list, and I'm
copying them down on a piece of paper. And when I'm

done,
I write them up and pass them out to everybody.
So the discussion that I'm doing there is
summarizing the effects, like vanilla and theobromine, but
we know where those things come from.
Q Okay. And, Dr. Farone, the document says the
additives "could" function as bronchodilators. Is there
any evidence that they do in fact function as
bronchodilators?
A Well, they do function as a bronchodilator.
I think you mean in the cigarette.
Q In the cigarette.

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A Again, the way one does that is you presume
that it does until you have evidence that it doesn't.
That's the way one tests the toxicology of additives to
any kind of food or something that you're --
Q If someone at Philip Morris has done the
analysis and they found that it takes two milligram of
theobromine to have a bronchodilating effect, which is the
equivalent based on the amount that they tested was in
cigarettes of 4,000 cigarettes a day, would that change
your opinion on whether the amount of chocolate in Philip
Morris cigarettes does in fact have a bronchodilating
effect?
A I would have to -- it could. I would have to
see how that analysis was done because I find that a lot
of times they are off by a factor of very much, 10 to the
fourth, in calculating the concentration.
Now, if you have --
Q But if the -- sorry. Go ahead. I apologize.
A If you have a 60 cc puff, you could have a
very tiny amount in there. You have to multiply by 1,667
to get from the amount that's delivered by the FTC test to
the concentration that the smoker gets.
Q Okay. Let's be clear.
You don't know the amount of theobromine
necessary to produce a bronchodilating effect in the

normal, average adult?
A I can look that up. I don't know it as I sit here.
Q As you sit here today, you don't know it?
A Correct.
Q You don't know the amount of theobromine that is actually present in Philip Morris cigarettes; right?
A I may. It depends on when you're talking about it.
Q Today.
A Well, the B & W report, I think, they analyzed for it, so I think I could find --
Q Okay. I'd like you to find it.
A Okay.
MR. BHATIA: Why don't we go off the record while Dr. Farone looks.
Let's mark the time we are going off the record.
(Off the record from 4:33 p.m. until 4:35 p.m.)
THE WITNESS: I found the table of percent cocoa and percent licorice. Now I need to find the way they determined that that's what it is by analysis of the theobromine and glycyrrhizin, and I think that's in here, too, so I found the cocoa and licorice percent.

MR. BHATIA: Just so the record is clear, Dr. Farone is looking at a document from B & W Research & Development in Louisville, and it bears Bates Number FAR02727 and continues for several hundred pages thereafter.
BY MR. BHATIA:
Q Have you had any luck yet?
A I find lots of reference to the cocoa and licorice. I have to find a section where they talk about how they know that it's cocoa and licorice which is usually done by --
Q Theobromine marker?
A Or a glycyrrhizin marker in the case of licorice.
I lost track of why we're doing this now, but I'm still looking for where they tell you how they came to the conclusion that it was --
Q Well, Dr. Farone, the reason why we're doing it is I asked you if you know the amount of theobromine in

any Philip Morris cigarettes. You refused to say that you didn't know that and thought that you could find a reference in which you could demonstrate that you did in fact know that. And so we've been waiting for you to find that reference?

A Okay. So far I have found a reference to the

amount of chocolate and licorice, which if you knew average concentration of theobromine in chocolate and in licorice you could in fact come up with some range.

I was trying to be complete in my -- I hate to say that I don't have any knowledge of something if I know in my mind that I have some knowledge of it. So what I'm doing now is trying to find the specific reference.

I know that in some of these B & W reports I have seen the reference to the fact of specific glycyrrhizin and theobromine, but --

Q I understand.

A -- this one doesn't have it.

Q And so as you sit here today, you do not know the amount of theobromine that is present in a finished cigarette made by Philip Morris; correct?

A Without a reference to some of this work, I wouldn't -- yes. I mean I wouldn't have known it before without the specific reference, yes.

Q Please answer my question.

A The answer is yes.

Q Do you know or do you not know?

A I do not know.

Q Thank you.

Now, I take it then since you don't know the amount of theobromine in a Philip Morris cigarette and you

don't know the amount that is necessary to have a bronchodilating effect, you do not know whether the theobromine that ends up in Philip Morris cigarettes as a result of the use of cocoa or chocolate ingredients does in fact have a bronchodilating effect; right?

A Does or does not. True.

Q You don't know either way?

A The presumption is that we don't know that it doesn't.

Q Your presumption is that you don't know

that
it doesn't, and that's fine for you.
My question, which I'd like you to answer, is
do you have any evidence that it does have a bronchodilating effect in the Philip Morris cigarettes
that Philip Morris makes and sells in the United States?
A Any evidence whatsoever?
Q Yes.
A The answer is yes.
Q What evidence?
A Well, we have to look at puff profiles to see
if cigarettes that -- Philip Morris cigarettes are inhaled, that the puff profiles are different than they
are without. If -- let me just explain where I'm coming
from. It may help.
As I understand it, you're trying to

determine what my testimony is going to be at trial.
Q Dr. Farone, do you intend to offer an opinion
at trial that the amount of chocolate used by Philip Morris adds enough theobromine to Philip Morris cigarettes
to produce a bronchodilating effect?
A I may.
Q When will you know one way or another whether
you intend to offer that opinion?
A When and if I have time to do what I was
trying to do here in a few minutes, to see whether or not
those things all tie together. I haven't had time to do
it.
Q As you sit here today, to a medical certainty
are you willing to say that the amount of cocoa used in
Philip Morris cigarettes does in fact have a bronchodilating effect?
A No, I'm not.
Q All right. Thank you.
Do you have any basis to disagree with my
statement that it would take approximately 400 milligrams
of theobromine a day to cause bronchial smooth muscle
relaxation?
A Yes, I do.
Q What is your basis for disagreeing with my
statement?

A Because you have provided me no evidence for

that statement. I don't agree with statements if they're not supported by some kind of evidence.

Q I didn't ask you, sir, to agree with my statement, with all respect. I asked do you have a basis for disagreeing with my statement?

A That you need 4,000 milligrams?

Q No. Sorry. 400 milligrams of theobromine a day to effect bronchial smooth muscle relaxation.

A Via inhalation from cigarettes?

Q Yes. Do you have a basis for disagreeing --

A No, I don't.

Q -- with my statement?

Okay. Have you ever stated to any official of the United States government that the amount of chocolate and cocoa added to Philip Morris cigarettes adds enough theobromine to have a bronchodilating effect on the smoker?

A No. They got -- received the same list that you have here.

Q So the answer to my question is?

A No.

Q The answer is no?

A Correct.

Q Now, the testimony you just gave on the use

of chocolate and cocoa and the amount of theobromine that is added as a result of it, would that same testimony apply to the other domestic cigarette manufacturers such as Reynolds or B & W?

A The testimony that 400 milligrams --

Q No. No.

A That it could -- I'm not sure what testimony you're referring to.

Q You have testified that you do not know whether the amount of cocoa added to Philip Morris cigarettes adds enough theobromine to have a bronchodilating effect.

My question is for any other cigarette manufacturer in the United States would your testimony be different or be the same?

A As I sit here right now, it would be the same.

Q Okay. Now, what other ingredients in cigarettes have a bronchodilating effect?

A Glycyrrhizin.

Q Glycyrrhizin ends up in cigarettes as a result of the use of licorice; correct?

A Correct.

Q What evidence do you have that the amount of licorice used in Philip Morris cigarettes or any other

cigarette made by a U.S. tobacco company adds enough glycyrrhizin to actually have a bronchodilating effect?

A It's the same problem. As I sit here today, I do not have those facts at my disposal.

Q Thank you.

Which ingredients added to tobacco have the effect of, quote, desensitizing the throat and lungs to smoke in order to make inhalation of smoke easier?

A Well, that includes but is not limited to the bronchodilators because that's one of the ways of doing it.

The other way is anesthetizing, so menthol is an example.

Q Anything other than menthol?

A Oh, yes.

Anything that acts as a primary -- as an irritant, which might allow it to mask, or smoother, so that would include things like propylene glycol, glycerine, bergamot oil, which is one of the things here. I'm just looking at the list.

Q Just so I understand your testimony, it's your belief that anything that makes smoke smoother or less harsh makes it easier to inhale; correct?

A That's one criterion.

Q Okay. So if things like humectants were

added to tobacco to make the tobacco less brittle and smoother so that the smoke was less harsh when burned, it would be your opinion that it would be easier to inhale that smoke?

A Correct.

Q Now, milk is a colloid; right?

A Yes.

Q And milk contains some pharmacologically active ingredients like tryptophan, for example; right?

A Tryptophan is -- you mean the amino acid?

Q Yes.

A Pharmacologically active in what sense?

Q Is it your belief that tryptophan is

not
pharmacologically active?
A Well, it's active -- it's metabolized. I mean you use it in the body. It's one of the amino acids so that you can incorporate in the cell thing. But normally we talk about changing body function. I don't know that eating proteins or whatever is --
Q You've never heard that warm milk makes people -- can make people sleepy because of the tryptophan?
A That wasn't my understanding.
Q A chocolate bar, it contains some caffeine, doesn't it?

A Yes, some, some chocolate.
Q Caffeine is pharmacologically active; right?
A Yes, it is.
Q And chocolate -- are there any other pharmacologically active ingredients in a chocolate bar?
A Theobromine.
Q Anything else?
A Well, there's a class -- I'm sure we could find other cocoa-related alkaloids just like you can find tobacco-related alkaloids.
Q Okay. Is caffeine a drug?
A Yes.
Q Is theobromine a drug?
A Yes.
Q Do you consider a chocolate bar to be a complex drug cocktail system?
A Not in the sense that those things are delivered the same way you do by inhaling it. But if you want to look at it in terms of the levels -- regardless of level, can it be used in such a way to deliver a drug? The answer is yes, just like this Diet Coke I have in front of me.
Q So Diet Coke is a complex drug cocktail delivery system?
A For ingestion.

Q The answer is yes?
A Yes.
Q And a lot of the things we eat contain pharmacologically active substances; right?
A That's correct.
Q And to the extent anything we eat contains a great number of different pharmacologically active substances, you would consider it to be a complex drug cocktail delivery system; correct?

A Correct, for administration of those drugs by ingestion, yes.
Q You testified that pyridine is the simplest nicotine analogue.
A Uh-huh.
Q Correct?
A Correct.
Q And pyridines are found in quite a number of foods that we encounter every day; right?
A Yes.
Q For example, do artichokes contain pyridines?
A I've never inhaled an artichoke.
Q Well, can you answer my question?
A Yes, it probably does.
Q Okay. So an artichoke then contains a nicotine analogue?

A Yes.
Q Okay. And asparagus, does it contain pyridines?
A Probably does.
Q So then asparagus contains a nicotine analogue?
A Uh-huh.
Q Cheese? Does cheese contain pyridines?
A Almost all foodstuffs that have protein in it will or can contain pyridines.
Q Tomato?
A Probably. There's a very small amount, I would presume, in tomato.
Q Peanuts? Do they contain pyridines?
A Yes, more than likely.
Q Cocoa? Does it contain pyridines?
A Probably.
Q So pyridines would be found in a chocolate bar then?
A Correct.
Q There would be a nicotine analogue in a chocolate bar?
A Correct.
Q Okay. Which type of smoke is easier to inhale, cigar smoke or cigarette smoke, from a blended

U.S. cigarette?
A Typically, the cigarette smoke -- we're talking about other things being equal, average cigarette, average cigar, then the cigarettes are easier to inhale.
Q Why is a cigar harder to inhale?
A Because the pH of the smoke is higher.
Q Why should that matter?
A We're going to reproduce my testimony of the earlier deposition. pH is critical to the delivery

of --
Q Focusing on cigar smoke inhaleability, can you tell me why it's harder to inhale cigar smoke? Is it harsher in its simplest -- I mean --
A In its simplest form, it creates a feeling in the back of your throat that makes it difficult to finish the inhalation process.
Q Okay. How many lives could be saved by your safer cigarette?
A Taken all the way to extreme?
Q Sure.
A Something on the order of maybe 300,000 per year.
Q Okay. What do you base that conclusion on?
A The epidemiological studies concerning smoking and health.
Q Okay. What studies?

A Those that are embodied in the Surgeon General's reports.
Q Does the Surgeon General's report contain a relative risk for smoking and death for the safer cigarette?
A No.
Q Okay. So how would you calculate the number of lives saved if you don't know the relative risk of death from smoking the safer cigarette?
A Say, probabilistic assessment, one can calculate the probability that you make. You start off with a basis of known number of deaths. What you're asking is to attribute that to various causes, whether it's heart attack, cancer, whatever it is, that portion that is attributed to smoking. I mean the simplest way of looking at it is to go to actuarial tables that are used by insurance companies where they have this in great detail, the difference in cost between an insurance policy for a smoker versus a non-smoker.
Q Right. But the last time I checked those actuarial policies, I didn't see a third column that said "Cost for smokers who smoke the safer cigarette."
A That's the column that I want to add to the table.
Q I understand. But it's not there right now,

is it?
A Not there right now.
Q Well, --
A But we have both extremes, right?
Q I understand.
Getting back to your testimony, though, let's say your ideas for a safer cigarette didn't work completely. Only one thing worked. For example, only your filter idea worked to reduce nitrous oxide and carbon monoxide. How many lives would be saved then?
A We have to look at the heart risk because that's where the carbon monoxide is basically involved, in the heart risk, and it would be some percentage of those that had increased risk of heart attack due to smoking.
Q How many?
A I'd have to go back and look at the tables, but there's a boundary between the situation as it exists now and not smoking at all, so that's a continuum, most likely, so that we know that as we improve the situation, we move from one situation toward the other. And my point is that if we save ten of those lives or twenty or one, that's the right thing to do.
Q Okay. But it could just as easily be twenty as it is one, couldn't it?
A Or one as it is twenty or a hundred thousand.

Q You don't know; that's the bottom line?
A The bottom line is that we can estimate what it would be epidemiologically on the basis of the test, but you cannot -- short of statistics, you can't know anything about the universe. Zero. Nada. I agree with you.
Q I disagree with that, but I mean, whatever. You're not an epidemiologist, though?
A I'm a statistician.
Q But you're not an epidemiologist?
A I'm a scientist, and I understand chemically -- you don't even know where that Coke can is without statistics.
Q Sure.
A So everything in science --

Q If you say so.
A No, it's not I say so. That's the fundamentals of thermodynamics, quantum mechanics, the very chemicals that Philip Morris deals in. The scientists there understand this fully well.
Q Right. But getting back to my question, what is the relative risk for a smoker who smokes a cigarette with your filter that reduces carbon monoxide and nitrous oxide?
A It's safer by some percentage.

Q Well, what is the percentage?
A I'm not prepared to give an opinion on that now and I probably won't be until some experiments are done which shows what the levels -- I mean the way to do that is to put it in the cigarette, and then the monitoring program that these gentlemen have suggested will tell us the answer.
Q Okay. But as you sit here now, you don't know?
A That's correct, not exactly.
Q And what about for any of the other proposed changes that you have to cigarettes, do you know what the relative risk would be for the cigarette made with those proposed changes?
A I do not know the exact percentage of reduction. All I know is that if in fact a reduction occurs, that's the right thing to do.
Q Okay. The bottom line is you don't know?
A The bottom line is I don't have a number, correct.
Q Right. And until the studies are done, you won't know; right?
A I won't know the number.
Q Right, you won't know the reduction?
A Correct.

Q Okay. And until you know what the relative risk is for smoking and death for smokers who smoke the so-called safer cigarettes, you won't be able to calculate the actual number of lives saved; isn't that right?
A No, that's not right.
Q Okay. Then how many lives are saved?
A I didn't say I could do it now. You

asked me
until I know would I be able to do it, and I'm telling you
is if I had more information statistically, we could calculate it now.
Q But you'd need the relative risk, wouldn't you, for smoking and death for the smokers of the safer cigarette so you'd have something to compare to?
A No, we don't need that. What we need is -- we need to know -- take carbon monoxide as a simple example. We need to know the fraction of deaths due to smoking that is attributable to heart problems. Segregating out of those the carbon monoxide risk, looking at the reductions in carbon monoxide -- for example, there's risks due to carbon monoxide for working around automobiles, so there is epidemiological information on carbon monoxide exposure -- we could then calculate the percentage of reduction and exposure and we could calculate a relative risk reduction.
What I was saying is that I don't have at my

disposal the numbers that are required to do that calculation. I'm not saying that it can't be done.
Q You couldn't do it until you produced the cigarette and people smoked it and you saw what happened?
A I can do it right now based on cigarettes that are on the market. Not all cigarettes deliver the same carbon monoxide.
Q And what studies exist that track smoker brand histories based on carbon monoxide content to allow you to make this calculation?
A We'd have to go look at some of the -- I think the German experience might be the most relevant where they keep track of carbon monoxide deliveries on cigarettes.
Q What study, sir?
A I don't know the study right now.
Q Okay. Right now you don't know?
A But I don't need the study to calculate the percent reduction.
Q What is the percent reduction then?
Either you know the percent reduction or you don't.
A The percent reduction in carbon monoxide? We

can look it up.
Q No, the percent reduction in risk of dying as a result of using your filter.

A I already testified I do not know the number. The second part of it that you we were trying to get me to say, I think, was that I didn't know how to do it. And I'm saying I know how to do it, and you do not need to have the thing made to be able to make the risk assessment. All you have to know is how much carbon monoxide people are exposed to and the reduction in the amount of carbon monoxide.
Q Okay. Right now you don't have an assessment of the actual number of lives that could be saved by making a safer cigarette?
A Correct.
Q Okay. Dr. Farone, is it your belief that the FTC method cannot measure the way an individual smoker smokes a cigarette?
A That it cannot? First of all, it's not a belief. It is my opinion that the FTC method, like any other standardized average method, does not measure the way an individual smokes a cigarette.
Q Okay. I'd like to mark as Exhibit 28 a copy of a release that was issued by the Federal Trade Commission in August of 1967, and it relates to the FTC method of testing.
Have you ever seen this document before?
A I don't recognize it.

(The document referred to above was marked Defendant's Exhibit No. 28 for identification by the Certified Shorthand Reporter and is attached hereto.)
Q So I take it it's probably not one of the documents that plaintiffs' counsel sent you.
A Well, this plaintiffs' counsel hasn't sent me very much, so I've --
Q Plaintiffs in the broadest sense.
MR. SHUB: Was this document produced in Mississippi?
BY MR. BHATIA:
Q Now, if you look at --
MR. SHUB: Off the record.
(Whereupon a discussion was held off the record.)

BY MR. BHATIA:
Q If you look at the top of page 2, first full paragraph, quote:
"In determining the testing method, the commission has not attempted to gauge the test to the amount of smoke or tar and nicotine which the average smoker will draw from any particular cigarette."
See that?

A Yes.
Q Is that something you agree with? Do you agree with that statement?
A I agree with the statement that the test doesn't. I'm not so sure I agree that that's not the way it was interpreted.
Q Right. But do you agree that the FTC, the Federal Trade Commission, at least believed when it adopted the method that it was not gauging the actual amount of smoke that a particular smoker would draw from a cigarette?
A That they were not intending to do that, yes.
Q Okay. And the next paragraph:
"No two human smokers smoke in the same way. No individual smoker always smokes in the same fashion. The speed at which one smokes varies both among smokers and usually also varies with the same individual under different circumstances even within the same day. Some take long puffs or draws. Some take short puffs. That variation affects the tar and nicotine quantity in the smoke generated."
Do you agree with that?

A Yes, all of those statements I agree with.
Q And you agree with the next paragraph then as well, I take it:
"Even with the same type of cigarette, individual smokers take a different number of puffs per cigarette depending upon the circumstances."
A Yes.
Q And then the remainder of that paragraph?
A Agree with it, uh-huh.
Q And, finally, the next paragraph:
"The Cambridge Filter Method..." --
And just so the jury's clear, the Cambridge Filter Method is the FDC method for testing cigarettes;

right?
A Yes.
Q "The Cambridge Filter Method does not and cannot measure these many variations in human smoking habits."
You agree with that; right?
A Yes.
Q Okay. And if you go down to the last full paragraph on that page, you'll see a statement by the FTC, the Federal Trade Commission, quote:
"To reiterate, the uniform method determined

by the Commission has as its purpose measurement of the tar and nicotine generated by cigarettes when smoked..." --
A Excuse me. You said the last full paragraph?
Q Yes.
A The last full one starts with "Accordingly."
Q Right. I'm looking at the last sentence of that, last full paragraph.
A Oh, I'm sorry. Yes. Go ahead.
Q Okay?
A Uh-huh.
Q "Thus, to reiterate, the uniform method determined by the Commission has as its purpose measurement of the tar and nicotine generated by cigarettes when smoking according to that procedure."
I mean you agree that that's what the FTC method does, it measures tar and nicotine delivery based upon the FTC method?
A Yes.
Q And it's a procedure that, by definition, doesn't measure the way in which an individual smoker smokes a cigarette; right?
A Correct.
Q And the FTC never intended -- at least

according to its release it never intended that the test would be anything other than a demonstration of how cigarettes performed under a specified set of conditions?
A Okay.
Q You agree with that?
A Yes.
Q Okay. Now, we have talked about a number of ways in which cigarettes have changed over time. Right?
We talked about filters. Right?
A Correct.
Q And you thought adding filters was a good

thing?
A Yes.
Q You'd rather see cigarettes with filters than without filters?
A Correct.
Q Why?
A Because generally with filters, when we added them, we had low tar, lower tar.
Q Why does that matter?
A Because the carcinogens, the teratogens, the mutagens are in the tar.
Q Why does that matter?
A Why does the delivery of toxic materials to the lungs of the smoker matter? Because, in general,

that's not something that I believe we should do or that, you know, anybody wants to do is deliver carcinogens, mutagens, teratogens, toxic materials into your lungs.
Q So you think that putting filters on cigarettes was a good thing because it made it possible to decrease the amount of mutagens, carcinogens, and teratogens that were delivered to a smoker?
A Correct.
Q We also talked about treating filters with a plasticizer such as triacetin which had the effect of reduce the phenols and some of the other smoke compounds that passed through the filter; right?
A It could have the effect of, yes.
Q And I think you acknowledged that it did in fact -- that treating the filter with a plasticizer such as triacetin did in fact reduce the phenols that were delivered to the smoker.
A Yes.
Q And there was selective filtration. I mean the filtration was greater than the amount of tar reduction in the cigarette; right?
A For phenols and certain ways of making the filter and triacetin, that's correct.
Q You thought that was a good thing?
A Yes.

Q Why?
A Because phenols are corrosive, they're toxic, and they had been implicated in some -- at least in human

exposure to phenols, per se, when you do the study with just phenols, if you look at the material safety data sheets, if you look up phenols and catechols and similar classes of compounds, that they have a very negative effect.

Q Now, I take it then you thought that treating the filter material with triacetin increased the likelihood that smokers would get less of the phenol and since the phenol was harmful, it was a good thing to reduce it?

A Yes, but you can't take the one thing out of context because if I don't make other commensurate changes, I could in fact cause them to smoke in a different way where the reduction that I had obtained goes away. But, generally speaking, under equivalent conditions, yes.

Q I mean all things considered, you wanted filters on cigarettes and filters with triacetin as opposed to no filters and no filters with triacetin?

A And triacetin isn't necessarily the best thing. That's something we knew did something, and we were looking for things that might be better than

triacetin.

Q Okay. But, again, answering my question, it was better to have a filter with triacetin than no filter with triacetin; right?

A Than no filter with -- I'm not sure that makes sense, but I understand what you mean.

Q It was better to have a filter with triacetin than a filter without triacetin?

A Yes.

Q And we talked about dilution and ventilation as a means of reducing some of the harmful constituents in tobacco smoke; correct?

A Correct.

Q And you, again, thought that that was a good thing; right?

A Correct.

Q I take it you thought it was a good thing because it decreased the amount of mutagens, carcinogens, and teratogens that got delivered to a smoker?

A And not only that. It decreases tar relative

to nicotine. So you could increase the nicotine-to-tar ratio, which I think is a good thing.
Q Okay. And that was a natural product of dilution?
A That was a --

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Q Strike that.
Reconstituted tobacco using the paper process, that had lower biological activity than lamina tobacco; correct?
A Correct.
Q And you thought it was a good thing that Philip Morris and other cigarette companies began to use reconstituted tobacco?
A Yes.
Q And porous paper, you thought that was a good thing because it added, I guess, to the dilution?
A Yes.
Q And the porous paper alters some of the burning temperatures so some of the gases, compounds, were not generated in as great quantities and delivered to the smoker; right?
A Yes.
Q And you described a number of different methods that the tobacco companies undertook to reduce the nitrous oxide content of cigarettes. For example, Philip Morris denitrified the solubles in the RL process, and other companies did other similar things. And you thought that was a good thing?
A Correct.
Q The Next cigarette that Philip Morris made,

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the denicotinized cigarette, you believed that that was a potentially safer cigarette; right?
A Potentially, yes, uh-huh.
Q You thought it was a good thing that they introduced it onto the market?
A Yes, it was.
Q And Premier, the cigarette made by Reynolds which heated instead of burned tobacco, you thought that was a step in the right direction in making a safer cigarette?
A That's correct.
Q And Eclipse, the other effort by Reynolds that is currently on the market, which is another way to

14 alter the way in which tobacco is burned, you thought that
15 also was a step in the right direction towards making a
16 safer cigarette; right?
17 A That's correct.
18 Q And the work Philip Morris did to prepare a
19 competitive response to Premier and Eclipse, if that leads
20 to a cigarette that is comparable to Eclipse with reduced
21 deliveries of harmful components, you would consider that
22 to be a good thing as well?
23 A If it did, yes.
24 Q And, in addition, there was a lot of
25 research that was ongoing at other tobacco companies, for

1 example, Japan Tobacco, on making cigarettes that were
2 safer?
3 A That's correct.
4 Q What is your explanation for why the tobacco
5 companies didn't do everything that they could have done
6 and instead only chose to do a few things such as what we
7 just discussed to make a safer cigarette?
8 A Well, I believe there's a lot of factors
9 involved in that, some business and some technical.
10 The business factors probably outweigh the
11 technical factors by a longshot.
12 One thing is concern over losing your
13 market. If you, in fact, provide lots of information
14 about safety and what you could do, it provides
15 information about the current relative risks, and people
16 who heard more and more about the risks might decide to
17 give up smoking.
18 I look at that the other way around. If you
19 make it safer, maybe they decide not to, but businesswise
20 I think there was a great fear of losing smokers. Business
21 goes away. If everybody knew everything about all the
22 risks involved, they may decide not to smoke. So it's a
23 business problem.
24 The other problem issue you have with any of
25 these companies that have an entrenched existing

1 product -- take Winston as an example -- RJR probably

doesn't want to do anything to change Winston if it's a very successful product. So even if they come up with something that would make it safer or better, they say, "Well, gee, if we use that, I might lose my percentage share of market of Winston and Marlboro might increase," or we could make the same discussion about Marlboro.

I sat through many discussions of that type, and these things are ongoing today, I'm sure, about how much business risk one wants to take by making safer cigarettes.

Q Okay. How do you know these discussions are ongoing today? You said these discussion are ongoing today, quote, "I'm sure," close quote.

A Well, we have the evidence of Reynolds taking the steps, removing the additives, putting Premium and putting Eclipse on the market.

We've got Dr. Townsend and the testimony in Florida now taking the position that "We're trying to make a safer cigarette, aren't we, and this is really a good thing to do."

We have the chairmen of the companies coming forward finally and saying, "Well, it might have caused some disease" or "It probably did."

So we're seeing a change in the whole

attitude. So that's why I say those discussions are ongoing. If they weren't ongoing, you wouldn't see all of those things happening.

Q So it's an assumption that you're making.

A No. It's a conclusion based on evidence which I just gave you.

Q Well, you assume that the discussions are ongoing? You like to call it a conclusion, but --

A It's not an assumption.

Q You haven't actually sat at any meetings at Philip Morris in the Philip Morris board rooms where this discussion was going on in the last week?

A No. And I've never seen an electron, but I can draw a lot of conclusions about it.

Q Well, let's not be glib.

If you were asked to say what Jeoffrey Bible said to Murray Bring at the last meeting in the Philip Morris board room about cigarette businesses, you couldn't do that, could you?

A No, that's correct.

Q It's -- you're assuming that these discussions are ongoing. You have no actual evidence that they're ongoing. I mean you don't know what happened at these meetings?

A No.

Q You didn't attend them?

A I'm providing you evidence and saying that on the basis of the evidence I provided it's a hypothesis. It's not an assumption. It's a hypothesis that that happened. I mean because that fits the facts. I'm a scientist, not a --

Q What I'm trying to understand is the second reason that you gave was it put current products at risk so they might not want to change a Winston. Why would they have to change a Winston? Why couldn't they just introduce a new product that had these new features?

A Because that's why they fail, because we do it as new products. That's not the place to do it. I mean if you want to make a safe cigarette, you put that technology in Marlboro because that's the people that are at risk, the ones using that product now. So one way to assure that your technology implementation fails is to put it in some new product which doesn't have the kind of backing, the kind of use, the kind of history, the kind of long-lived following that an existing product does. To me you know that a technology is there and people are going to use it and stand behind it when they put it in the main-line product of their company.

Q Well, Reynolds has put the no-additive tobacco in Winston.

A That's correct, because their sales compared

to Marlboro were going down, so they figured, "What have we got to lose now?"

Q But they put it in Winston?

A Absolutely.

Q And that was the thing that you thought they'd never do?

A That's right.

Q So they did what you thought they'd never do?

A And I said that was the right thing to do.

Q Now, Philip Morris, when it introduced filters, ventilation, porous paper, introduced them onto its flagship Marlboro brand to produce Marlboro Lights and Marlboro Ultra Lights?

A That's right.

Q And that was the right thing to do?

A Correct.

Q And, in fact, Marlboro Lights today sells more than Marlboro Reds in terms of volume in the United States.

A Okay.

Q Okay. Now, I think in your report -- I'm trying to find the exact reference.

Let me just ask you is it your belief that the industry failed to introduce safer cigarettes because of fear of liability?

A Oh, that's a business risk, yes.

Q Well, --

A It's not a belief. It's an opinion.

Q It's an opinion.

Why would they introduce some changes to the product and not others if they're afraid of liability? Why wouldn't they go all the way?

A The changes that they were making they saw as being a market plus. For example, we talked about the FTC method not really telling you what a smoker gets. Yet all the advertising we saw for two decades played off that as being that it was meaningful, lower tar. So it was an implied health claim as you indicated earlier.

Q Okay. But why would they do the research on new cigarette designs and then fail to introduce them? Why wouldn't they just not do the research at all in the first place if they were afraid of liability?

A Okay. It's my opinion that -- and that's where I think the regulation by FDA is beneficial although they may protest -- that in the long run that's going to be very beneficial to the industry as are settlements because they allow them finally to start using

those innovations that they have accumulated over the years in producing safer products. And if you did have a situation where a drug application allowed you to make a claim that it was safer, not directly the way we were talking about before, that's going to sell more cigarettes.

Q I don't think you answered my question. I asked you why it is they did the research in the first place and failed to implement it if they were afraid of liability. Wouldn't they have been better off just not doing the research at all?

A Well, I've heard both sides of that argument. In one context, you know, I remember being told that that's why we stopped doing it is because we'd rather not know the answers to those questions, with DeNoble's work, for example. So that was said.

Q But what about the other example? Why do the research in the first place if producing the knowledge of how to make a safer cigarette and failing to implement it creates the liability issue? Why not just not do the research at all?

A If you look at the history, I can -- I think I can answer that question.

If you think about the history of the industry, almost every industry -- and the tobacco

industry is probably one of the most sensitive to this -- goes through these "Let's do it because we want to make it safer."

"Oh, my goodness. All of these negative reasons why we can't."

There's cycles of management philosophy that come and go within any company.

In my eight years there I saw the shift

from
one end to the other. I mean when I went there, the objective was, "Let's do it. Let's make it safer. Let's go ahead and do it."

And by the time I left, "Let's not do this. Let's not know."

So there is that change. I don't know whether you call it fashion or trend. But there are cycles of management philosophy. And this isn't critical to the tobacco industry. Look at gasoline usage in automobiles. I mean there are fashions that go with regard to products.

Q But other than the change of fashion, you have no explanation for why they did the research, failed to implement it, as opposed to not doing the research at all?

A I indicated that when they did the research, their intent was to use it. They developed the result.

They worry about using the result, so they don't use it.

Q By there were many things they did use. How do you explain that?

A I explained it by saying that the ones that could be introduced without changing the nature of their market gradually so that they didn't lose smokers are the ones that they introduced.

If the change meant a risk of losing smokers, what they would do is put that in another product that they could allow to fail and don't implement that particular piece of technology in a flagship brand.

Q Well, take NOD, for example, the naturally occurring denitrification. If you're right and it didn't affect subjectives at all, why not just do it?

A If -- I didn't say it didn't affect the subjectives. If the subjective changes could be overcome -- we had acceptable NOD products. There's a report, the Susan Dobberstein report, that says the economics were not that horrible. I don't know why not just do it. I mean my answer to that is they should have just done it.

Q But what's your explanation for failing to do it? Is it fear of liability? How can it be? Doing

the
24 research and not implementing it creates the risk of
25 liability. And here is an example where you can use
it in

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1 existing products, you say, and it won't affect the
2 product subjectives. Why not use it?
3 A I'm not an attorney, but on the
liability
4 issue, the way I understand it is you only have
liability
5 if in fact it can be proven that that's the reason
why you
6 stopped doing it.
7 For example, if you say, "Well, I
didn't do
8 it because it didn't taste good," then somehow
people
9 think that's going to absolve you of the liability.
So
10 there's those philosophies that --
11 Q Well, okay. But what is your basis for
your
12 belief that Philip Morris failed to implement
product
13 changes because they were afraid of liability
concerns for
14 making safer cigarettes?
15 A The fact that they did not implement
changes
16 that they knew to be leading toward a safer
cigarette,
17 that they knew that they could overcome through
flavor
18 changes.
19 Q And how do you explain the fact that
they did
20 make a great number of changes that by your own
admission
21 made the product safer?
22 A Because those particular changes did
not run
23 the risk of changing the product to cause them to
lose
24 market share versus their competitors.
25 Q So it wasn't a fear of liability, per
se; it

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1 was a fear of losing customers?
2 A And both things play into it.
3 Q Okay. Now, if Philip Morris could make
the
4 absolutely safe cigarette and its competitors didn't
have
5 it and it could demonstrate that, would smokers
smoke
6 Philip Morris, or would they smoke Reynolds?
7 A My absolutely safe cigarette with the
8 nicotine analogue that keeps them addicted?
9 Q Not your absolutely safe cigarette.
Whatever
10 the cigarette is. If Philip Morris could
11 make the safe cigarette, the absolutely safe

cigarette,
and smokers loved it, --
A If you can sell social -- I'm sorry.
Q -- would smokers smoke Philip Morris, in
your opinion, or would they smoke Reynolds?
A They'd smoke Philip Morris.
Q Okay. And Philip Morris would make a bunch
of money?
A Correct.
Q Even more than they make right now?
A Absolutely.
Q Why not do it?
A That's -- because in order to do it, you have
to go the FDA route, you'd have to agree that it's a drug,
and you'd have to apply for I.N.D.'s, and you have to do

all of the things that the industry doesn't want to do.
Q That assumes you have to use this nicotine
analogue for your -- I mean that's your safe cigarette;
right? You don't have to go to the FDA if there's some
other safe cigarette that doesn't require the addition of
nicotine analogues?
A Maybe that was true a year ago. I'm not so
sure it's going to be true --
MR. BHATIA: This is different. We're talking
about the past anyway.
Okay. Why don't we continue tomorrow at --
MR. SHUB: Say, 8:45.
MR. BHATIA: Perfect. Very fine.
(The proceedings were adjourned at 5:30 p.m.)
--oo0oo--
(DECLARATION UNDER PENALTY OF
PERJURY ON THE FOLLOWING PAGE)

DECLARATION UNDER PENALTY OF PERJURY
I hereby declare under penalty of perjury
that the foregoing is my deposition under oath; are

the
questions asked of me and my answers thereto; that I have read same and have made the necessary corrections, additions or changes to my answers that I deem necessary.

In witness thereof, I hereby subscribe my name this _____ day of _____, 19___.

_____

WILLIAM A. FARONE, Ph.D.

(Volume II)

CERTIFICATE
OF
CERTIFIED SHORTHAND REPORTER

The undersigned Certified Shorthand Reporter of the State of California does hereby certify:

That the foregoing deposition was taken before me at the time and place therein set forth, at which time the witness was duly sworn by me;

That the testimony of the witness and all objections made at the time of the examination were recorded stenographically by me and were thereafter transcribed, said transcript being a true copy of my shorthand notes thereof.

In witness whereof, I have subscribed my name this date: _____.

_____

Certificate Number 2974